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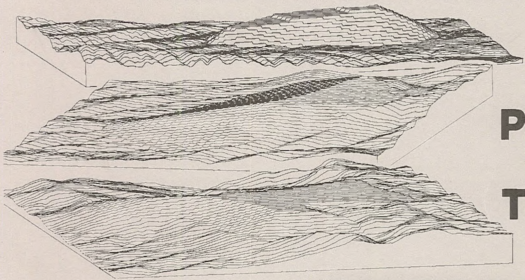
ENVIRONMENTAL IMPACT STATEMENT



FEDERAL PROTOTYPE OIL SHALE TRACT C - a

OFFTRACT LEASE

U.S. Department of the Interior
Bureau of Land Management
White River Resource Area
Craig District, Colorado

TD
195
.04
F422
1986

March 3, 1849

United States Department of the Interior

IN REPLY REFER TO:
2920 (162)
C-37744

BUREAU OF LAND MANAGEMENT
Colorado State Office
2850 Youngfield Street
Lakewood, Colorado 80215

NOTICE

The Final Environmental Impact Statement on the Federal Prototype Oil Shale Tract C-a Offtract Lease has been completed. This FEIS incorporates public and other government agency review comments that were received during the public review period. Reviewer comments were made at public hearings and by letter. These comments and BLM's responses are included within this document.

The FEIS is not the decision-making document. Management decisions cannot be made until 30 days after the publication of the Notice of Availability of the FEIS in the Federal Register by the Environmental Protection Agency. A Record of Decision, documenting the management decisions, will be written and distributed when all supporting analysis and consultation are completed.

Public comments on this FEIS will be accepted for 30 days at the BLM's White River Resource Area Office, PO Box 928, Meeker, Colorado 81641.

Comments must be received by November 30, 1986.

Thank you for your interest and assistance in this project.

Sincerely,

Neil F. Morck
State Director

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FINAL
ENVIRONMENTAL IMPACT STATEMENT FEDERAL PROTOTYPE OIL SHALE TRACT C-a OFFTRACT LEASE

Prepared By:

Bureau of Land Management
U.S. Department of the Interior

State Director
Colorado State Office

FEDERAL PROTOTYPE OIL SHALE TRACT C-a
OFFTRACT LEASE
ENVIRONMENTAL IMPACT STATEMENT

Draft ( ) Final (X)

LEAD AGENCY: U.S. Department of the Interior, Bureau of Land Management
White River Resource Area
Meeker, Colorado

TYPE OF ACTION:

Administrative (X) Legislative ( )

ABSTRACT: This environmental impact statement assesses the environmental effects of offtract disposal of waste materials associated with a proposed open pit mine on Federal Prototype Oil Shale Lease Tract C-a. The Proposed Action is to place retorting and other facilities, plus waste materials on an area adjacent to Tract C-a known as 84 Mesa. Alternative sites for waste disposal were investigated in areas known as Philadelphia Creek and the West Fork of Spring Creek. Additionally, a No Action Alternative was evaluated in which no offtract leasing would occur, but all facilities and wastes would be placed within the existing lease boundaries of Tract C-a. The decision-making process involved in the selection of a Preferred Alternative included consideration of environmental factors, resource management considerations pertinent to the mineral rich Piceance Basin, and the overall goals of the Federal Prototype Oil Shale Leasing Program.

EIS CONTACT: Questions or comments on this EIS should be addressed to:

John Fend, Project Coordinator
Bureau of Land Management
White River Resource Area
PO Box 928
Meeker, Colorado 81641
Telephone (303) 878-3601

DATE STATEMENT MADE AVAILABLE TO U.S. ENVIRONMENTAL PROTECTION AGENCY AND THE PUBLIC:

Draft Statement: September 26, 1985
Final Statement: October 1986

DISTRIBUTION LIST

FEDERAL AGENCIES

- Department of Agriculture
  - U.S. Forest Service
  - Soil Conservation Service
- Army Corps of Engineers
- Department of Energy
- Department of the Interior
  - Bureau of Indian Affairs
  - Bureau of Mines
  - Bureau of Reclamation
  - Fish and Wildlife Service
  - Geological Survey
  - Minerals Management Service
  - National Park Service
  - Western Area Power Administration
- Environmental Protection Agency
- Nuclear Regulatory Commission

STATE AGENCIES

- Colorado Department of Health
- Colorado Department of Highways
- Colorado Department of Natural Resources
- Colorado State Clearing House
- Colorado State Historic Preservation Office
- Colorado Water Conservation Board

LOCAL AGENCIES

- Associated Governments of Northwest Colorado
- Garfield County
- Mesa County
- Rio Blanco County
- Town of Rangely
- Town of Meeker
- City of Rifle
- Town of Silt

OTHER ORGANIZATIONS AND INDIVIDUALS

Over 200 organizations and individuals have also expressed interest in the environmental impact statement and have been sent copies for review.

TABLE OF CONTENTS

PREFACE v

SUMMARY 1

CONSULTATION AND COORDINATION IN THE REVIEW OF THE DRAFT EIS 7
List of Comment Letters 7
Comment Letters 8
Responses to Comment Letters 55

CHANGES TO THE DRAFT EIS 69
Chapter II — Description of the Alternatives 69
Chapter III — Affected Environment 69
Chapter IV — Environmental Consequences 72
Chapter V — List of Preparers 74
Errata 74

APPENDICES 77
Appendix A — Prototype Lease: Tract C-a 77
Appendix B — Committed Mitigation 129
Appendix C — Environmental Protection Performance Standards for the Preferred Alternative (84 Mesa) 135

LIST OF TABLES

Table S-1 — Summary of Environmental Consequences 2
Table 1 — Quality of Lurgi Process Water and Treated Water 68

LIST OF FIGURES

Figure II-16 — Final Pile Slope Design 70
Figure III-7 — Generic Stratigraphic Column of Uintah Formation and Upper Green River Formation 71

PREFACE

PREFACE

INTRODUCTION

This is the final environmental impact statement (FEIS) on the Federal Prototype Oil Shale Tract C-a Offtract Lease. Comments on the draft environmental impact statement (DEIS) did not require significant changes in data, analysis, or conclusions. Therefore, the DEIS has not been reprinted. A limited number of copies of the DEIS are available upon request to the:

District Manager
Craig District Office
Bureau of Land Management
455 Emerson Street
Craig, Colorado 81625

The FEIS includes a revised summary, Consultation and Coordination in the Review of the DEIS, and Changes to the DEIS. Chapters I through V of the DEIS are incorporated by reference. Minor corrections to these chapters are made in the errata section of the FEIS. Committed mitigation has been included in the FEIS. Additionally, performance standards have been developed for the Preferred Alternative in response to the comment letters.

DIFFERENCES BETWEEN THE DRAFT AND FINAL

Public comments received on the DEIS did not require extensive changes in the data, analyses, or conclusions. Therefore, except for the Summary and Committed Mitigation sections, the DEIS has not been reprinted. In most cases, comments required minor corrections or clarifications to the text. These changes have been made and generally clarify the analysis without altering it. In other cases, the analysis has been expanded to add new information in response to comments.

CHANGES THAT WERE NOT MADE TO THE FINAL EIS

Numerous changes and major revisions were recommended but were not made. Some of these are described below, but all have been explained in detail in the responses to comment letters.

SCOPE

Several comments addressed a need for long-range mine planning for the whole Piceance Basin oil shale resource. Please see the revised summary for an explanation of the scope and assumptions under which this document was prepared.

ALTERNATIVES

Many people who responded believed that various other alternatives should be analyzed in addition to those described in the DEIS. These included total disposal needs of Tract C-a, phased development of Tract C-a, and additional "on the resource" alternatives. No new alternatives have been analyzed. See the revised summary and response numbers 6, 7, 13, 15, 16, 21, 29, 32, 33, 50, 51, and 71 for the rationale.

The responses to the comments on the DEIS are included in this document.

SUMMARY

SUMMARY

This final environmental impact statement (FEIS) describes and analyzes the consequences of spent shale waste disposal off Tract C-a. A No Action Alternative and three alternative offtract disposal sites have been analyzed.

Federal Prototype Oil Shale Tract C-a is currently under a temporary lease suspension that was issued by the U.S. Department of the Interior (USDI). The suspension was issued to allow for consideration of Rio Blanco Oil Shale Company's (RBOSC) request for an offtract lease for disposal of waste materials from a proposed open pit mining operation. The suspension commenced on August 1, 1982, and will continue until the USDI issues to the lessee an offtract lease for disposal of spent shale; or July 31, 1987, which ever occurs first. The terms of the Mineral Leasing Act of 1920 prohibited additional leasing of lands to an existing oil shale lease holder. The act was amended in 1982 to allow the Secretary of the Interior to consider a 6,400-acre offtract lease to the holder of the Tract C-a lease, currently RBOSC, for disposal of waste material and the location of facilities. RBOSC subsequently submitted a proposal to lease 6,400 acres of an area adjacent to Tract C-a known as 84 Mesa. This EIS analyzes the proposal and alternatives developed by the Bureau of Land Management.

Complete mining of Tract C-a from boundary to boundary would produce more waste disposal material than could be accommodated on a 6,400-acre offtract lease. This EIS does not address the complete disposal needs of a totally open pit mined tract, but only addresses the legally mandated limitations of a single 6,400-acre offtract lease. The exact mining approach has not yet been defined by RBOSC. The EIS does not further analyze the direct impacts to Tract C-a itself, as this is an existing Prototype Oil Shale Tract that was leased on the basis of a previous EIS. The previous EIS and other environmental studies were incorporated by reference into the DEIS and were updated where necessary. The main focus of this EIS effort is to assess potential consequences from the proposed disposal of waste materials on the public lands and to compare the alternatives in order to select the preferred alternative. Many of the specifics of the operational aspects of the project, particularly concerning ancillary facilities not directly concerned with disposal activities, are not analyzed in the document, but will be addressed once a leasing decision is made and if leased, a Detailed Development Plan (DDP) is submitted for approval.

Alternatives to the Proposed Action on 84 Mesa include disposal sites located in Philadelphia Creek and the West Fork of Spring Creek plus a No Action Alternative. The alternative sites are located off the oil shale resource in an area roughly west of Cathedral Bluffs. Waste disposal to these sites would be reached by an overland conveyor system ranging in length from 5.5 to 7.7 miles (84 Mesa conveyor length is 2.7 to 6.2 miles). The No Action Alternative would involve no offtract lease for disposal of waste materials and location of facilities. Under the No Action Alternative, all activities would remain on Tract C-a, but RBOSC would still have the right to develop the resources there by whatever method deemed feasible, subject to approval of a DDP.

Significant environmental impacts would occur, regardless of the alternative selected, including the No Action Alternative (in which case only Tract C-a and RBOSC's private land holdings would be impacted). Although all resource impacts are fully addressed, the main focus of the EIS is to assess the potential consequences of the proposed disposal of several billion cubic yards of waste materials on federal lands. The goal of the EIS was to identify the alternative that could best minimize environmental impacts, while still allowing the realization of the goals of the Federal Prototype Oil Shale Program.

PREFERRED ALTERNATIVE

BLM determined that the Proposed Action (84 Mesa) is also the Preferred Alternative. This determination was made on the basis of environmental factors, resource management considerations, and by considering the goals of the Prototype Oil Shale Leasing Program.

Many respondents identified their choice for the preferred alternative as the No Action Alternative. Although the No Action Alternative would result in the least amount of degradation because it would limit impacts to the smallest area, the No Action Alternative would not best serve the public interest, because the development of alternative energy technologies might not be furthered.

OTHER ACTIONS

In order to initiate lease issuance, procedures would have to be followed in accordance with Section 302 of the Federal Land Policy and Management Act (FLPMA) concerning lease processing. Steps that would have to be taken include making a market value rental determination (including an evaluation of mineral values forgone); issuing a Notice of Realty Action to inform the Governor of Colorado and other parties of the lease decision; and issuing after a 45-day comment period, a Notice of Determination to Proceed or Vacate the decision. A lease document would be developed according to terms and conditions set forth in the Code of Federal Regulations (CFR) (Sec. 2920.7), and stipulations resulting from this environmental impact statement would be incorporated into the lease. Those stipulations would be developed from the recommended committed mitigation (Appendix B). In response to the comment letters, several performance standards have been developed for the Preferred Alternative (Appendix C). The offtract surface lease may not serve more than one federal oil shale lease (Tract C-a) and may not be transferred except in conjunction with the transfer of the federal oil shale tract that it serves. The environmental resource protection stipulations included in the prototype lease would not apply to the surface lease for waste disposal. Please see Appendix B for a listing of the committed mitigation from which environmental resource protection stipulations would be developed for the offtract surface lease. A brief summary of environmental consequences has been tabulated on the following pages. Please see the DEIS for more details.

TABLE S-1
SUMMARY OF ENVIRONMENTAL CONSEQUENCES

	Alternatives			
Resource Element	Proposed Action (84 Mesa) 1/	Philadelphia Creek 2/	West Fork of Spring Creek 2/	No Action 3/
Air Quality	Disposal would result in 6% of total TSP emissions from the project. All state and federal standards would be met, except 24-hour TSP Class II increment would be exceeded near Tract C-a.	Equivalent to 84 Mesa.	Equivalent to 84 Mesa.	Long-range impacts would be two-thirds of 84 Mesa, but with a greater likelihood that Class II increments would be exceeded near Tract C-a.
Topography	Topography would be significantly altered.	Topography would be significantly altered. Additional impacts due to conveyor system.	Topography would be significantly altered. Additional impacts due to conveyor system.	Fewest impacts to topography.
Solid Minerals	Would recover 26% of oil shale resources from Tract C-a. Disposal on 84 Mesa could result in a 2% loss of oil shale resources under 84 Mesa. Disposal may mean lower bonus bids from future leasing and reduced royalties for 84 Mesa.	Would recover 32% of oil shale resources from Tract C-a. No oil shale resources encumbered. Possible loss of 18% of coal due to disposal. Coal has low development priority.	Would recover 34% of oil shale resources from Tract C-a. No oil shale resources encumbered. Possible loss of 39% of coal due to disposal. Coal has low development priority.	The open pit option would allow 16% recovery of oil shale resources from Tract C-a. Underground options would allow 34% or 36% recovery, but the remaining oil shale resources would be forgone.
Fluid Minerals	Disposal would impact up to 60 billion cubic feet of gas resources, but partial recovery by directional drilling possible. Mining of Tract C-a would impact up to 145 billion cubic feet of gas reserves, but partial recovery by directional drilling possible.	Disposal would impact six existing wells and gas reserves up to 9.5 billion cubic feet with no possible recovery by directional drilling. Mining impact as stated for 84 Mesa.	Disposal would impact one existing well and gas reserves up to 16.3 billion cubic feet with no possible recovery by directional drilling. Mining impact as stated for 84 Mesa.	Mining impact as stated for 84 Mesa.
Hydrology, Alluvial Valley Floors, Floodplains	Disposal pile leachate production could reach 230 gpm, but may take years to get to such a state. Leachates could degrade surface and groundwater resources for a very long period.	Leachate discharge could be 23% greater than 84 Mesa, with less deep seepage and more surface water effects. Less potential adverse effects to groundwater than at	Leachate discharge could be 33% greater than 84 Mesa, with less deep seepage and more surface water effects. More water control measures would be necessary.	Impacts from Tract C-a mining similar to 84 Mesa, except area could be different where groundwater adversely affected.

TABLE S-1 (Continued)
SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Resource Element	Alternatives			
	Proposed Action (84 Mesa) 1/	Philadelphia Creek 2/	West Fork of Spring Creek 2/	No Action 3/
Hydrology, Alluvial Valley Floors, Floodplains (Cont.)	Open pit mining Tract C-a would impact underlying aquifers and interconnect the two. Small areas of alluvial valley floors and floodplains on Tract C-a would be affected.	84 Mesa. Other impacts from Tract C-a mining as described under 84 Mesa.	Less potential adverse affects to groundwater than at 84 Mesa. 38 acres of a 100-year floodplain would be impacted. Other impacts from Tract C-a mining as described under 84 Mesa.	
Wildlife, T/E Species	Potential displacement of 645 mule deer. Reclamation potential of wildlife habitat would be good. No significant impacts to terrestrial T/E species anticipated.	Potential displacement of 445 mule deer. Reclamation potential of wildlife habitat would be adequate. Impacts to T/E species as described under 84 Mesa.	Displacement of 575 mule deer. Reclamation potential of wildlife habitat would be adequate. Impacts to T/E species as described under 84 Mesa.	Displacement of 350 mule deer. Reclamation potential of wildlife habitat would be poor. Impacts to T/E species as described under 84 Mesa.
Livestock Grazing	Potential loss of 789 AUMs and 69% reduction of cattle herd from one grazing allotment.	Potential loss of 1,057 AUMs spread out over 3 separate allotments, thus overall impact may not be as great as for 84 Mesa.	Potential loss of 1,307 AUMs spread out over 3 separate allotments, thus overall impact may not be as great as for 84 Mesa.	Potential loss of 343 AUMs from two allotments.
Wild Horses	Potential loss of 60% of important wintering habitat on 84 Mesa. Potential loss of important water supply near Tract C-a. Migration and genetic interchange may be restricted. Forage competition with livestock.	Potential loss of important wintering habitat, water resources, and restricted movements. Impacts not as severe as 84 Mesa.	This area outside the wild horse herd area. Potential loss of important water supply near Tract C-a.	Potential loss of important water supply near Tract C-a.
Forestry	May impact 3,884 acres commercial pinyon-juniper wood land. Potential loss of woodland on Tract C-a a significant impact to the WRRA Forest Management Program.	May impact 5,932 acres commercial pinyon-juniper woodland. Greatest potential im- of all alternatives to WRRA Forest Management Program.	May impact 3,260 acres commercial pinyon-juniper woodland. Not a serious impact to WRRA Forest Management Program, except potential losses on Tract C-a.	May impact 1,810 acres commercial pinyon-juniper woodland. Potentially significant impact to WRRA Forest Management Program.

TABLE S-1 (Continued)
SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Resource Element	Alternatives			
	Proposed Action (84 Mesa) 1/	Philadelphia Creek 2/	West Fork of Spring Creek 2/	No Action 3/
Lands and Realty	11 prior existing rights would be impacted.	11 prior existing rights would be impacted, including facilities of a natural gas field.	10 prior existing rights would be impacted.	7 prior existing rights would be impacted.
Cultural Resources	135 known cultural resources would be impacted.	92 known cultural resources would be impacted.	90 known cultural resources would be impacted.	80 known cultural resources would be impacted.
Paleontology	An unknown amount of paleontological resources would be impacted.	Similar to 84 Mesa.	Similar to 84 Mesa.	Similar to 84 Mesa, but fewer impacts.
Social	Negative social impacts from population fluctuations could occur from development of Tract C-a. Offtract disposal would have little additional impact.	Similar to 84 Mesa.	Similar to 84 Mesa.	Similar to 84 Mesa, but less impact due to fewer workers.
Economic	Development of Tract C-a could have significant economic consequences, but offtract disposal would have little additional impact.	Similar to 84 Mesa.	Similar to 84 Mesa.	Similar to 84 Mesa, but less impact due to fewer workers.
Recreation	11,363 acres of hunting recreation area would be impacted.	7,381 acres of hunting recreation area would be impacted.	6,809 acres of hunting recreation would be impacted.	5,102 acres of hunting recreation would be impacted.
Visual Resources	VRM Class IV areas would allow evident changes to existing landscapes.	VRM Class III and Class II areas would allow less change than a Class IV area. Impacts to sensitive visual resources would occur.	VRM Class III and Class II areas would be impacted. Impacts would be more severe than 84 Mesa and less severe than Philadelphia Creek.	Similar to 84 Mesa, but fewer impacts.
Transportation	No road segment would exceed 20% of capacity.	Similar to 84 Mesa.	Similar to 84 Mesa.	Similar to 84 Mesa, except fewer impacts due to a smaller work force.
Noise	Major noise would result from retorting. Maximum level of 55 db at 1 mile, with no impact to residents.	Similar to 84 Mesa	Similar to 84 Mesa.	Less production would result in less noise produced.

TABLE S-1 (Continued)
SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Resource Element	Alternatives			
	Proposed Action (84 Mesa) 1/	Philadelphia Creek 2/	West Fork of Spring Creek 2/	No Action 3/
Net Energy	Energy resources would be converted to a common unit of measurement (Btus). Shale disposal would require an additional 0.01x10^6 Btu.	Shale disposal would require an additional 0.02x10^6 Btu.	Same as Philadelphia Creek.	To produce 1x10^6 Btu, it would utilize 0.16x10^6 Btu, not including energy required for shale disposal.
Vegetation, T/E Species	Plant communities on 11,488 acres would be impacted. Would be no impacts to T/E species.	Plant communities on 11,544 acres would be impacted. Less restortion potential than 84 Mesa. Some candidate and sensitive species would be impacted.	Plant communities on 12,928 acres would be impacted. Less restortion potential than 84 Mesa. Some candidate and sensitive species would be impacted.	Plant communities on 5,102 acres would be impacted. Would be no impacts to T/E species.
Soils	Would be highest reclamation potential and best opportunity to control erosion.	Would be least soil available for reclamation. Western aspect of disposal pile would result in drier soils.	Would be deeper soils but higher content of clays and salts, thus reducing reclamation potential. Would be greater erosion control problems.	Would be least amount of disturbance to soils.
Spoil Pile Design and Construction	The flat terrain of 84 Mesa may contribute to pile stability and erosion control.	Disposal would be a valley fill with possible erosion control problems during construction.	Similar to Philadelphia Creek, but more extensive water diversion would be necessary.	Similar to 84 Mesa, but on a smaller scale.
Surface Reclamation	Sufficient growth medium would be available to allow standard revegetation techniques. Good potential for establishment of a diverse plant community.	Techniques would be similar to 84 Mesa, but with less available growth medium and less diversity in plant community establishment.	Comparable to Philadelphia Creek.	Comparable to 84 Mesa, but on a smaller scale.

1/ Includes the Common Area and Tract C-a.
2/ Includes the Common Area, Tract C-a, and Right-of-Way Corridor.
3/ No offtract activities.
4/ Threatened and endangered.

CONSULTATION AND COORDINATION IN THE REVIEW OF THE DRAFT EIS

CONSULTATION AND COORDINATION IN THE REVIEW OF THE DRAFT EIS

The final EIS includes a copy of all the written comments on the draft EIS; oral testimony presented at public hearings held in Golden (November 7, 1985) and Meeker (November 5, 1985), Colorado, and responses to those comments. Each individual substantive comment on the DEIS that appears in the Consultation and Coordination section has been bracketed, and a number has been assigned to it that corresponds to a written response. If a particular comment is simply an observation or is in agreement with the text, no response has been made.

COMMENTS ON THE DRAFT EIS

The letters appear in the order they were received by the project coordinator. Following the letters, are the public hearing transcripts in the order the hearings were held. To reduce the total volume of reprinted materials in the text, extensive attachments to some comment letters that do not raise specific issues have not been included. Those portions of the letters that have not been reprinted are available for public review in the BLM White River Resource Area Office in Meeker, Colorado, and in the BLM Colorado State Office in Denver, Colorado.

For ease of reference, the letters have been listed according to source. The letter number refers to the number in the upper right hand corner of each comment letter.

LIST OF COMMENT LETTERS

Respondent	*Letter Number*
FEDERAL AGENCIES	
Department of the Interior	
*Bureau of Reclamation	5
*Bureau of Mines	10
U.S. Fish and Wildlife Service	21
*National Park Service	15
*Bureau of Indian Affairs	23
U.S. Geological Survey	11
Advisory Council on Historic Preservation	3
Department of Agriculture	
Forest Service	19
Environmental Protection Agency	24
*Nuclear Regulatory Commission	8
Department of Transportation	
*Federal Highway Administration	20
COLORADO STATE AGENCIES	
Department of Natural Resources	22
Department of Highways	9
Department of Health	14
ENVIRONMENTAL AND PUBLIC INTEREST ORGANIZATIONS	
Friends of the Earth	18
PROFESSIONAL CONSULTANTS	
John Donnel	17
INDUSTRY AND INDUSTRIAL ASSOCIATIONS	
Marathon Oil Company	13
Tell Ertl Trust	12
David Munson, Inc.	1
INDIVIDUALS	
*Georgie Leighton	6
*Stan Smerey	2
William Fruedenberg	4
Arthur Lewis	7
Anita Johnson	16
*A. Dudley Gardner	26
PUBLIC HEARINGS	
**Meeker, Colorado: November 5, 1985	
Golden, Colorado: November 7, 1985	25

* — No response required.
** — No attendance.

DAVID M. MUNSON, INC.
1525 Elm Street, Suite 1900
DALLAS, TEXAS 75201-3591

Tel. (214) 954-0260

October 7, 1985

1985 OCT 10

Mr. Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P. O. Box 928
Meeker, Colorado 81641

Re: Draft Environmental Impact
Statement for Federal Prototype
Oil Shale Lease Tract C-a

Dear Mr. Smith:

This company is actively involved in producing gas in and around the area surrounding the C-a oil shale tract. (Former Sage Brush Hills II Unit Area).

This company has been involved in this area for more than ten years. Subject to the fluctuation of energy prices, we hope to be able to continue to develop additional gas reserves in this area in coming years.

We are very concerned with the proposed spent shale dumping in the 84 Mesa area since we feel that this will very negatively impact gas development that has proven to be viable, and this gas development would be sacrificed for an oil shale development project which has not proven to be viable. 1

If this C-a tract is to be developed at some future date, which I very seriously doubt, it would be my suggestion that the West Fork Spring Creek site or the Philadelphia Creek site would have less impact on gas developments than the 84 Mesa.

The C-a oil shale tract is located in an area where the shale is below the aquifer level. It is my contention that this particular tract is going to be prohibitively expensive to develop and produce. If oil shale does become an economic process, it will be in areas

where the shale can be processed without the adversities of water encroachment, such as along the Colorado River and to the west of the C-a shale tract where the shale out crops and can be delt with above the aquifer.

It makes no sense at all to me to sacrifice the government's royalty on natural gas in a very large area for a possible royalty on oil shale on a tract that has not proven to be economically feasible today, and has very little hope of becoming feasible in the future because of the aquifer problems of this tract, versus numerous other oil shale locations that are not so handicapped.

Sincerely yours,

David M. Munson

David M. Munson

DMM/jw

2

Amoco Production Company
Denver Region
1670 Broadway
P.O. Box 800
Denver, Colorado 80201
303-830-4040

Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P.O. Box 928
Meeker, Colorado 81641

Sir:

Recently I received a draft copy of "Environmental Impact Statement"/ Federal Prototype Oil Shale Tract C—a./Offtract Lease. I noticed in Chapter V of "Consultation and Coordination" page 326 under Stan P. Smerey that the experience should read:

Experience: Rio Blanco Oil Shale Company, 8 years
Amoco Production Company, 22 years

Please rectify this for the final publication. 22

Yours truly,

Stan P. Smerey

3

Advisory Council On Historic Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

Reply to: 730 Simms Street, Room 450
Golden, Colorado 80401

October 17, 1985

Mr. Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P.O. Box 928
Meeker, CO 81641

REF: CO/Tract C-a Offtract Lease

Dear Mr. Smith:

The Council is in receipt of the Draft Environmental Impact Statement for the above referenced project. Because of the size and destructive nature of the proposed undertaking and the large number of historic properties that may be adversely affected by its implementation, we strongly recommend that the Bureau of Land Management initiate consultation with the Council, pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR Part 800, as soon as possible. We also recommend that a Memorandum of Agreement between the Bureau of Land Management and the Council be developed for the undertaking. It has been our experience that such a Memorandum of Agreement benefits not only the included cultural resources, but the smooth and timely functioning of the proposed project. 3

If you have any questions regarding this matter, please contact Sheila Stump at 776-2682, an FTS number.

Sincerely,

Robert Fink
Chief, Western Division
of Project Review

Washington
State University

Department of Sociology / Department of Rural Sociology, Pullman, Washington 99164-4006 / 509-335-8623

October 11, 1985

Mr. Butch Smith, Project Coordinator
U.S. Bureau of Land Management
White River Resource Area
P.O. Box 928
Meeker, Colorado 81641

10

RE: Identification of Social Impacts in Draft Environmental Impact Statement: Federal Prototype Oil Shale Tract C-a Offtract Lease

Dear Mr. Smith:

These comments focus on a narrow portion of the above-noted draft environmental impact statement (EIS), namely its discussion of social impacts. The central problem is that the social impact portion of the EIS is so narrow as to be essentially nonexistent. 4

The preparers are to be commended for listing "social" impacts separately from "economic" ones, rather than assuming that economic variables somehow "take care of" social variables. As the summary of public scoping comments notes (p. 323), the established social science literature as well as the concerns of local citizens indicate that "project development is likely to have substantial impacts on nearby communities; these impacts are likely to be social as well as economic in nature, and should be analyzed." Unfortunately, the draft EIS fails to analyze them.

As a Ph.D.-level sociologist with over 10 years of experience in studying the social impacts of western energy development, I can assure you that there are now literally dozens of books (and hundreds of papers, journal articles, and other sources of information) on the social (not just economic, but social) impact of western energy developments. The Bureau of Land Management itself supported a large-scale research project on what it called "sociological" impacts, further contributing to this literature. Not a single one of these easily accessible sources was even cited in the draft EIS. Nor does this document suggest that its preparers have anything like the degree of familiarity with the various non-economic social science disciplines--notably sociology, psychology, and the anthropology of living (including Anglo) cultures--that is called for both by the National Environmental Policy Act and the Council on Environmental Quality's highly explicit regulations for implementing the procedural provisions of the Act.

In dealing with the "affected environment," for example, the draft EIS's description of the social environment is roughly one-half page long in its entirety. It consists of a general background and then four paragraphs that "update" the draft Piceance Basin RMP/EIS of April, 1984. The first paragraph discusses the houses for sale and the impact suffered by (presumably municipal) services in Meeker as a result of the recent "bust" in the area. The second and third essentially have something to do with local employment, with the third adding a brief note that the shutdowns "have left Rifle overbuilt and financially troubled" (p. 141). Note that these are all essentially economic impacts, not social, cultural or psychosocial ones. Only the fourth brief paragraph moves slightly away from the area of economics, although even this paragraph, which has vaguely to do with attitudes, focuses on economic growth. Its discussion, moreover, is misleading if not inaccurate. (The paragraph claims that Rifle and Rangely "have tended away from their traditional conservatism and now actively seek growth," even though efforts to attract growth are as well established and "traditional" in both of these towns, and even in Meeker, as are the communities themselves.) Inexplicably, the large and increasingly well-known body of social science literature on the non-economic impacts of rapid energy growth--some of which has come from this very region--is ignored completely.

If the section on the affected environment contains sins of omission, however, the discussion of likely impacts on the social environment combines the above with many sins of commission. This section offers a reasonable characterization of the rates of growth that have been associated with disruption in western communities, and it at least uses some of the terms that are common in the social science literature. Yet it actually misuses rather than uses many of the terms, with the net result being that a number of the comments simply make no sense--even to professional social scientists, and on repeated readings--while a number of the others are simply wrong. The overall impression that emerges is that the preparers were able to obtain at least some vague idea of the types of variables that needed to be included in this section (whether from reviewing other documents, holding discussions with qualified social scientists, and/or having at least portions of drafts being prepared by persons with the necessary qualifications) but that the preparers then decided what to include on the basis of coin tosses, random number generators, and/or armchair discussions with persons not having such qualifications. As a result, the draft EIS fails to identify essentially all of the significant social and cultural impacts that are likely to be created if off-site disposal of spoils allows oil shale development to proceed in the manner envisioned in this EIS. 4

I respectfully suggest that your office re-read the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act. These regulations explicitly call for "information . . . of high quality" and "accurate scientific analysis" (40 CFR 1500.1 [b], emphasis added). They require consideration of direct and direct social and cultural affects (40 CFR 1508.8), emphasizing the "human environment" as "interpreted comprehensively" (40 CFR 1508.14) in a manner that provides full "scientific integrity" and scientific sufficiency (40 CFR 1502.22 and 1502.24).

I also call your attention to the fact that the absence of an adequate data base cannot, by any stretch of the imagination, be interpreted as a legitimate excuse under the relevant regulations for simply ignoring impacts. Instead, the regulations make it clear that if it is feasible to obtain the relevant data--which is clearly the case with respect to the proposed oil shale development--the agency is then responsible for obtaining the relevant data. As an example of this point, you may wish to consider the contrast between the discussion of the affected social environment on page 141 and the discussion of the affected cultural resources on pages 131-138, just a few pages earlier. The discussion of the cultural environment excludes any mention of the human cultures currently living in the area, thus reflecting a more narrow definition of cultural impacts than contained in the recent federal court decision on the inadequacy of an earlier Department of Interior EIS--Northern Cheyenne Tribe v. Hodel, No. CV 82-116-BLG (d. Mont. May 28, 1985). Despite this limitation, however, the discussion of the "cultural environment" contains actual data, along with some suggestion that the Bureau of Land Management itself has performed some of the work necessary to assemble the necessary data. The section on the social environment does not.

The EIS also needs to contain real data on social impacts, and the Bureau of Land Management is required by the CEQ regulations (a) to obtain the necessary data and (b) to possess the expertise necessary to analyze the data and summarize them in the EIS in a manner that can contribute to informed decisionmaking. While Dr. Davida Gates provided some of the necessary expertise during the several years when she was employed by the Bureau of Land Management, this draft environmental impact statement provides substantial evidence that the necessary expertise is now lacking from your staff.

As a place to begin your efforts to rectify the almost complete omission of the necessary information on social and cultural impacts, you may wish to begin with two book chapters on the social and cultural impacts of western energy development--one of which deals specifically with oil shale development--that were provided to your office by this writer on August 9, 1984, as "input on the scope of a planned environmental impact statement (EIS) on leasing approximately 6400 acres of land adjacent to federal prototype lease tract C-a." A copy of the earlier letter is enclosed for your convenience; if you have misplaced the book chapters, please let me know, and I will mail you replacement copies at my own expense.

While I believe you will find the two chapters to provide a useful starting point for your efforts, however, this draft EIS itself is clear evidence that you also need social scientists on your staff who have expertise outside the area of economics. An economic perspective is no more sufficient for dealing with social, cultural and psychological impacts than is training in meteorology for assessing the likely impacts of developments on aquatic ecosystems. If you desire further assistance in obtaining the necessary information and expertise, please do not hesitate to contact me.

Sincerely,

Wm R Freudenburg, Ph.D.

William R. Freudenburg
Associate Professor

ls
Enclosure

5

United States Department of the Interior
BUREAU OF RECLAMATION
UPPER COLORADO REGIONAL OFFICE
P.O. BOX 11568
SALT LAKE CITY, UTAH 84147

NOV -4 [illegible]
BUREAU OF LAND [illegible]
WHITE RIVER [illegible]
MEEKER, CO [illegible]

IN REPLY REFER TO: UC-150
120.1

NOV 1 1985

Memorandum

To: District Manager, Bureau of Land Management, White River Resource Area, P.O. Box 928, Meeker, Colorado 81641

From: Acting Regional Director
Bureau of Reclamation

Subject: Review of Draft Environmental Impact Statement for the Federal Prototype Oil Shale Tract C-a, Colorado (DES 85-43)

We have reviewed the subject document and have no comments to offer. Thank you for the opportunity to review.

Thomas Gamble

6

RECEIVED
1985 NOV -5 [illegible]
BUREAU OF [illegible]
WHITE [illegible]
MEEKER [illegible]

Mr. Butch Smith,
Project Coordinator
Bureau of Land Management
White River Resource Area
P. O. Box 928
Meeker, CO 81641

November 3, 1985

RE: Draft EIS for Tract C-a. Comments. 2920 C-37744

Tract C-a/84 Mesa seem a likely losing proposition -- what guarantee is there that by the time production starts in approximatly 18 years:
1) the process will yield 1,3 BILLION barrels of oil;
2) the price will be competitive - just contemplate Diagram Fig II-11, plus aquifer manipulation, overburden treatment, etc. someone will have to pay for it all;
3) that a replacement for oil/gas will not be "invented" by then.

Only a conventional WW III in the near future would make this system vital.

The damage done to land, wildlife and communities exposed to another boom cycle -when jobs are few for the "locals" but bring in outsiders - the outlook is bleak.

Many nitty gritty questions remain: where will RBOSC find a "contractor with his own disposal site for hazardous wastes outside C-a/84 Mesa"?

Can the White River Reservoir satisfy the demand for water when the plant hums along at full capacity? What will the side effects be of manipulating upper and lower acquifer? Engêneers can only theorize. 84 Mesa will be a 60-year eyesore before it can be benched, revegetated - and may still leach poison for man and beast.

But powers - to - be ordained that Tract C-a will be here.

The migratory deer herd is well known and is just recuparating from rough winters. 645 mule deer will lose their habitat. Although deer tend to avoid human harassment, hunting seasons are set to coincide with the first snow-caused descend from higher altitudes. Legitimate killing and poaching will take its toll. A workforce between 2,000 - 3,900 with peak of 5,000 and all the necessary support systems, traffic, etc. will spell doom to all species.

6

Remember what happened to wildlife along the Alaska pipeline! Securing firearms and commuting by bus are excellent suggestions.

The negative aspect of displacement/loss of habitat is well expressed on page 225 and nothing can be added.

Raptors, judging by EIS page 227 "Environmental Consequences" will be more impacted even than deer. They do not adapt to changes and coupled with the loss of prey species they will have to abandon their nest sites. It may take too long for a disturbed area to be restored to help the birds. Artificial nesting platforms worked well in Texas, provided there is a prey base.

It is obvious, that the perpetual underdog, the Wild Horse, (perhaps we should adopt the word "underhorse"!), is the most affected by Tract C-a/84 Mesa. The development is encroaching on the Wild Horse Management Area set aside for them - with no other place to go. They cannot flee anywhere without being rounded up as tresspassers. Although you are stating that in this case "Multiple use ... give wild horses preference", (page 239) your wording under "Livestock Grazing" (page 233) could start a cattlemen anti-wild-horse uprising! You imply that replacing the lost 180 AUMs from Box Elder's 1,124 AUMs equals'stealing'from cattle, because stock may have to be reduced to 190 heads! Cattle allotments range north to the White River, west to the Utah border. Of 1,521,806 acres, wild horses were allocated 107,000 acres, The Wild Horse Management Area. They have no other refuge. As you know, this year's round-up included a hadfull of "greys" from Piceance Creek because they utilized a private "checkerboard." These remaining horses have paid the price - they deserve those miniscule 180 AUMs!

The mitigation efforts on behalf of the wild horses as described in Appendix E (page 340) are to be supported, all seven points.

Also praizeworthy is the Wildlife Mitigation Plan - the best that can be done under these difficult circumstances. The Colorado Division of Wildlife could cooperate by limiting hunting and trapping in the C-a/84 Mesa until "the dust settles".

This development is another example that the victims of man's "progress" are non-human species; in this case many humans, too.

Georgie Leighton
P.O. Box 1431
Aspen, CO 81612

7

Lawrence Livermore National Laboratory

November 5, 1985

Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P.O. Box 928
Meeker, Colorado 81641

Dear Mr. Smith:

I have read with great interest the draft Environmental Impact Statement for an Offtract Lease for Federal Prototype Oil Shale Tract C-a, dated September 1985. There is a great deal of information assembled therein and you are to be complimented for your effort.

I have followed oil shale activities and plans by government and industry for well over a decade. During this time, I have participated in research on oil shale technology here at LLNL. The comments that I have are my own however, and may or may not represent opinions of LLNL or the Department of Energy.

Tract C-a on the western side of the Piceance Basin sits in the middle of the best oil shale resource for open pit development. This is by far the most economical and environmentally least destructive method of utilizing this huge resource. I am enclosing a paper which describes the resource and some of the opportunities for development which I published in 1980, "The Potential, The Problems, and a Plan for Development", ENERGY, Apr. 1980, V.5, No. 4. The land to the north of Tract C-a and to the south and swinging eastward is the prime land as defined by thickness of oil shale and depth of overburden. 84 Mesa has as much oil in place as Tract C-a and each constitute oil equivalent to about a third of the total proved Petroleum reserve in the U. S. Successful development of just one prototype tract will firmly establish the value of 84 Mesa. To consider making this resource unavailable for the future, in order to reduce somewhat the expense of disposing of waste from C-a and because some land titles are uncertain, is incredibly short sighted. 5

I believe that any action to bury valuable oil shale resources with waste material from mining operations will be regretted. It is certainly true that the tract size is too small to take advantage of the optimum scale of open pit mining suitable for this resource. The answer is a large scale operation covering a wider area than Tract C-a. This requires some broad planning on your part and recommendations for a change in legal restrictions to such

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plans, in order to allow efficient mining and disposal over a long time period. If C-a is successful it will certainly be in the Nation's interest to be able to expand production beyond the boundaries of C-a both north to 84 Mesa and to the south.

The lease holder would almost certainly find it unacceptable if an adjacent tract holder wanted to bury part of his lease. If the lease holders felt a sense of urgency they would also proceed much more aggressively to develop and improve the technology necessary to produce shale oil. If you decide to grant a lease it should be limited in time and contingent on early development by the lease holder in keeping with the intent of the prototype leases. 6, 29 In addition the amount dumped on 84 Mesa must be limited to that mined in the first few years - only enough to establish commercial feasibility. After that, alternative sites must be used which do not bury the best parts of the resource.

The use of 86 Mesa for purposes other than disposal is acceptable as a temporary and non-wasteful use of the public lands.

In summary, I believe that you should not allow this prime public resource to be buried by waste material from Tract C-a. All efforts should be directed to devising a development plan for the resource that will allow large scale operations and overcome some of the legal issues such as lease size and uncertain titles to the land. Time seems to be available for this approach. 7

Yours sincerely,

Arthur E. Lewis

Arthur E. Lewis
Oil Shale Project Leader

AEL:7541K

Enclosure

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NOV 12 1985

Mr. Butch Smith
Bureau of Land Management
White River Resource Area
P. O. Box 928
Meeker, CO 81641

Dear Mr. Smith:

In response to the letter dated September 26, 1985, from Mr. Kannon Richards to the Nuclear Regulatory Commission, we have reviewed the Draft Environmental Impact Statement (EIS) prepared by the U.S. Department of Interior for the Federal Prototype Oil Shale Tract C - a Offtract Lease. Our review was directed to whether the action described in the draft EIS involved matters within our jurisdiction by law or special expertise or had any potential impact on NRC licensed facilities. No potential effects were identified; therefore, we have no specific comments on the draft EIS.

Thank you for the opportunity to review the draft document.

Sincerely,

James P. Knight, Acting Director
Division of Engineering
Office of Nuclear Reactor Regulation

STATE OF COLORADO

DEPARTMENT OF HIGHWAYS
222 South Sixth Street, P.O. Box 2107
Grand Junction, Colorado 81502-2107
(303) 248-7208

November 25, 1985

Mr. Butch Smith
Project Coordinator
Bureau of Land Management
White River Resource Area
P. O. Box 928
Meeker, CO 81641

Dear Mr. Smith:

15 The Colorado Department of Highways District III Office in Grand Junction has reviewed the Draft EIS for the Tract C-a Offtract Lease, and we have the following comments on the proposal.

As the proposed action in the Draft EIS involves the selection of an off-ite waste disposal site relatively close to oil shale Tract C-a, there are no apparent impacts to highways serving the lease tract disposal area. Therefore, we have no comments on that specific action.

However, the need for the waste disposal area is a direct result of developing and mining lease Tract C-a, and our past comments on the oil shale leasing program in general still apply. We note in reviewing the Impacts Section that the full development of Tract C-a in itself will not substantially impact highways serving the site, but we also note under the Cumulative Impacts Section, page 295, that SH 13 north of Rifle will be functioning above 85-percent capacity after project year 5 or 6 and above capacity after year 15. This will mean a major breakdown in traffic flows prior to those years because of the additional truck and bus traffic and the existing steep highway grades. It will also mean a significant dollar investment to resolve those impacts and problems. As we have noted in several past comment lettrs dealing with oil shale and energy developments in western Colorado, this Department will be financially unable to make those required highway improvements in a realistic time frame based on past and present funding trends. Therefore, this issue will remain largely unresolved until some future date when it will necessitate resolution.

However, we do request that climbing lanes be added on steep grades on SH 13 north of the junction of SH 325 and require that intersection channelizations be constructed at the intersections of County Road 5 and proposed County Road 24 where they intersect with State Highways 13 and 64. (Note attached map.) The intersection channelizations are required in accordance with the Colorado Access Code and should be constructed in conjunction with this project. 8

We appreciate the opportunity to review this proposal at this time and expect to work with you in the future to resolve the transportation impacts that increased energy development will bring.

Very truly yours,

R. P. MOSTON
DISTRICT III

Laurence R. Abbott
By LAURENCE R. ABBOTT
DISTRICT ENVIRONMENTAL MANAGER

LRA/jme

Attachment

cc: Siebels
Chocol/Geddy
Moston/Perske
File

9

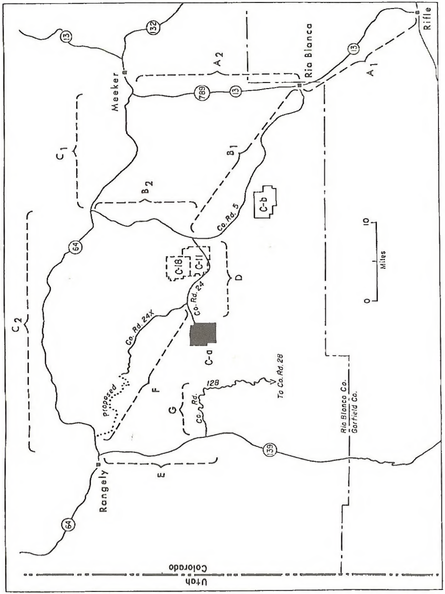


Figure III-29. State Highways and County Roads Servicing Tract C-a.

10

United States Department of the Interior

BUREAU OF MINES

P. O. BOX 25086
BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225
Intermountain Field Operations Center

November 27, 1985

Memorandum

To: Butch Smith, Project Coordinator, Bureau of Land Management, White River Resource Area, P.O. Box 928, Meeker, Colorado 81641

From: Chief, Intermountain Field Operations Center

Subject: Draft Environmental Impact Statement of Federal Prototype Oil Shale Tract C-a Offtract Lease

The subject document has been reviewed by personnel of the Bureau of Mines for possible impacts the proposed activity may have on mineral resources and production facilities. The action being proposed is the placement of retorting and other facilities, plus excavated overburden and spent oil shale, on an area adjacent to Oil Shale Tract C-a. Three alternative waste disposal sites and one No Action Alternative involving no offtract leasing were evaluated in the draft statement.

Significant impacts, both positive and negative, on mineral resources are discussed in the DEIS. The most obvious, and beneficial, impact would result from the successful development of the mining and retorting project, which would help achieve the national goal of attaining alternative energy sources. Offtract waste disposal, however, is imperative to the successful development of the project. Carried out as planned, the disposal area is not sufficient to allow complete mining of the reserves on Tract C-a. Further, waste disposal on any of the three alternate sites will result in the loss of in-the-ground mineral resources of oil shale, coal, oil or gas. As noted in the document, recoverability of resources (oil shale) in the areas to be covered by waste disposal under the preferred alternative (84 Mesa Site) is still being questioned and none of the preferred alternatives are entirely without drawbacks.

In our opinion, the subject document conveys an awareness of all the problems outlined above and seeks to sort out the best of the less than entirely satisfactory alternatives available. We, also, have reservations regarding mineral development versus the commitment of other in-the-ground resources, but feel that the document is comprehensive and provides an adequate assessment of the mineral resource situation. We have no objections to the environmental impact statement as written.

W Cochran
William Cochran

United States Department of the Interior
GEOLOGICAL SURVEY
BOX 25046 M.S. 939
DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY REFER TO:

Office of Energy and Marine Geology
Branch of Energy Minerals

December 2, 1985

Mr. Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P.O. Box 928
Meeker, Colorado 81641

17

Dear Mr. Smith:

Comments on the Draft EIS for the proposed off-site disposal area for Federal Oil Shale Lease C-a in Rio Blanco County, Colorado, are enclosed.

It is concluded that BLM's preferred waste-rock disposal site on 84 Mesa as outlined in the Draft EIS would significantly degrade the oil-shale resource in the Piceance Creek Basin, especially in the part of the basin that has the best potential for open-pit mining. If used as a waste-disposal area, the resources of oil shale, nahcolite, and dawsonite under 84 Mesa would, at best, probably be deferred for commercial development for many years to come. It is unlikely that companies would be interested in mining through 400 to 1,100 feet of unconsolidated waste rock of unknown physical and hydrologic characteristics, plus an equal thickness of bedrock when oil shale would be available at shallower depths in other parts of the basin. 5

The amounts of mineral resources are significantly larger on 84 Mesa than are present on the C-a tract. Leasing 84 Mesa may set a precedent for future leasing whereby lessees may ask for adjacent oil-shale lands of high quality for disposal of overburden and spent shale. Further, 84 Mesa can only accommodate about one-half of the waste rock that the C-a lessee would mine under an open-pit operation of maxiumum size. Presumably, the lessee would need another area as large as 84 Mesa for additional waste-rock disposal, which would further degrade the oil-shale resource if the tract were selected within the basin. 13

Only one core hole has been drilled on the 84 Mesa site: U.S. BurMines-AEC Colorado core hole 2 on the north side of the tract. The attached geologic cross section shows that the grade and thickness of oil shale increases significantly from west to east across the tract. Nahcolite and dawsonite are present in unknown but probably large amounts. These minerals probably increase in quantity from west to east across the tract. However, to my knowledge there are no laboratory analyses of either mineral for core hole 2. The presence of nahcolite is also influenced by the configuration of the

dissolution surface. For these reasons, the 84 Mesa site lacks sufficient core drilling and analytical data to adequately determine the amounts of shale oil and sodium minerals that are present. Many core holes were drilled and analyzed prior to leasing the C-a and C-b tracts. 84 Mesa should also be adequately explored by drilling to gain a clear picture of the geology and mineral resources prior to leasing. 9

From the viewpoint of conservation of the largest single resource of synthethic fuel in the nation, 84 Mesa is clearly the poorest of the alternative sites discussed in the Draft EIS. 12

Sincerely yours,

John R. Dyni

John R. Dyni, Geologist

cc: Tom Fouch

Enclosure

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT, FEDERAL PROTOTYPE OIL SHALE TRACT C-a OFFTRACT LEASE

by John R. Dyni
U.S. Geological Survey
Denver Federal Center, Colorado
December 2, 1985

CATHEDRAL BLUFFS AREA

No significant amounts of fossil-fuel resources appear to be affected on the alternative disposal sites located in Philadelphia Creek and in the West Fork of Spring Creek. No signficant amounts of oil shale are present on either site. The coal-bearing Mesaverde Formation underlies both sites. By geologic inference to adjacent areas where the Mesaverde crops out, it can be expected that the two sites are underlain by one or more beds of coal. The depth, thickness, and grade of these beds are not known for lack of core drilling and analyses. Coal has not been mined in either area, although some prospect pits may have been dug. Emplacement of spoil piles on the Philadelphia Creek and Spring Creek sites may destroy the potential for mining coal in these areas. Both sites have some potential for oil and gas in several formations older than the Mesaverde; however, oil and gas drilling should not be seriously curtailed by the presence of spoil piles. If significant accumulations of oil and gas were found in areas beneath the spoil piles, the hydrocarbons could be reached by directional drilling, if necessary. The West Fork of Spring Creek and Philadelphia Creek sites contain no significant quantities of oil shale.

84 MESA

The 84 Mesa site contains enormous quantities of oil shale, as well as, large amounts of dawsonite and nahcolite. Furthermore, 84 Mesa has excellent potential for recovery of these minerals by open-pit and underground methods of mining. The geology of the 84 Mesa site is somewhat complicated because it is located in a marginal part of the Piceance Creek Basin where the grade and thickness of the oil shale, nahcolite, and possibly dawsonite change rather abruptly owing to depositional conditions and to post-depositional dissolution of nahcolite by ground water. Only one core hole has been drilled on this 6,400-acre site. Subsurface data from this core hole, and from off-site core holes, do not seem to be sufficient to determine the resources of oil shale, dawsonite, and nahcolite on the 84 Mesa site for the purposes of this EIS. It should be noted that many exploration holes were drilled by companies on the C-a and C-b tracts prior to bidding on these tracts. Is it in the best interests of the Federal Government to lease 84 Mesa without better knowledge of the valuable mineral resources that will be impaired by use of the site for waste-rock disposal? 9

The one drill hole drilled on 84 Mesa is located on the north side of the site (U.S. BurMines-AEC Colorado core hole 2) in sec. 14, T. 1 S., R. 99 W.). Fischer assays and a detailed lithologic log are available for this core hole, but there are no laboratory analyses for nahcolite or dawsonite. To my knowledge no other core holes have been drilled on the 84 Mesa site. The resource data presented in the Draft EIS for 84 Mesa, especially for nahcolite and dawsonite, cannot be verified and could be in gross error. 10

The enclosed figure is a stratigraphic section drawn from core hole C217 on Tract C-a, northeastward through C35 on the north side of the 84 Mesa site, then eastward to core hole C332 which is located about 4.4 miles east of the 84 Mesa site. Fischer assays were made by the U.S. Bureau of Mines on core samples from the three holes, and the data have been released on computer tapes to the public through NTIS. Computer-smoothed profiles of the oil yields from Fischer assays are plotted for each core hole. The numbers to the right of the profiles indicate the average shale-oil yield for each R and L oil-shale zone in the core hole. It can be noted that the oil yields for most zones increase to the east with the exception of the R-3, R-4, L-4, and R-5 zones. These four zones show an apparent decrease in average shale-oil yields in the core hole C332; however, the presence of nahcolite in core hole C332 dilutes the oil shale. Most likely, the oil shale in these zones is of richer grade in core hole C332 than in the other two core holes when calculated on a nahcolite-free basis. It should also be noted that there is some lower-grade oil shale in a sequence about 100 to 200 feet thick at the base of the R-8 zone just above the Mahogany zone. Was this oil shale included in the resource estimate? 11

The vertical distributions of nahcolite and dawsonite obtained from X-ray data and lithologic descriptions of core hole C35 (Trudell, 1966) are shown to the right of the shale oil profile, but quantitative laboratory analyses of these minerals have not been made. A small amount of nahcolite may be present near the base of core hole C217. The vertical distribution of nahcolite in core hole C332 is estimated from the "gas plus" and water values reported in the Fischer assay data for this core hole. The vertical distribution of dawsonite is not known. The cross section illustrates the importance of the dissolution surface when making quantitative estimates of nahcolite on the 84 Mesa site. In core hole C35, the sequence of nahcolitic oil shale is about 300 feet thick (including some leached oil shale) and as much as 785 feet thick in C332. To estimate the nahcolite resources on the 84 Mesa site, the position of the dissolution surface needs to be better known. 10

Using an indirect method based on Fischer assay data, Beard, Tait, and Smith (1974) estimated the amounts of nahcolite and dawsonite in core hole C35. Their method does not determine the amount of "excess alumina," which is found in dawsonitic-bearing parts of the oil-shale sequence, nor did they calculate the nahcolite that is present above the lowest evidence of leaching (depth of about 2,110 ft) in core hole C35. The upper and lower parts of the dawsonitic sequence were also excluded from their estimate. Their method must be supported by X-ray diffraction data; if other minerals that can contribute water in a Fischer assay are present, such as illite and analcime, the method is invalid. Both minerals are present in increasing amounts toward the basin margins. Although the resource maps published by Beard and others (1974, figs. 7-11) are adequate to make a preliminary analysis of the resources of nahcolite and dawsonite in the Piceance Creek Basin, their maps lack sufficient well control to calculate these resources on the 84 Mesa site. 10

IMPACTS ON MINERAL RESOURCES

Despite the shortcomings in mineral resource estimates for the 84 Mesa site in the Draft EIS, it is clear that many billions of tons (and dollars) of resources of oil shale, nahcolite, and dawsonite will be seriously impaired by selection of 84 Mesa as the preferred site. In contrast, the selection of one of the other sites would result in a relatively small loss of mineral resources that are present in greater abundances in other parts of the region. Not only would the minerals on 84 Mesa be seriously degraded, or completely lost because it may not be economic to mine them, but bonus bids amounting to hundreds of millions of dollars would be lost both to the Federal and local governments. From the standpoint of conservation of valuable mineral resources on the public lands, it is difficult to see how 84 Mesa was chosen as the preferred site. 12

IMPACTS ON WATER RESOURCES

Percolation of waste and natural waters through spoil piles on 84 Mesa may eventually degrade the quality of the ground waters in the Piceance Creek Basin. Laboratory studies have clearly demonstrated that large quantities of salts can be dissolved from spent shale. These salts could be a major source of contamination of ground waters in the northwestern part of the Piceance Creek Basin. Because spoil piles on 84 Mesa would not be contained, they may be susceptible to slumping and accelerated erosion during wet years. This has been dramatically demonstrated during recent years of above average precipitation with the numerous landslides and slumps that have occurred in the Wasatch Formation and surficial deposits (material not unlike that of the spoil piles) in and adjacent to the Piceance Creek Basin. These effects could further degrade not only the oil-shale resource on 84 Mesa, but also oil shale in areas of the basin downstream from 84 Mesa. 14

Although similar problems of erosion, slides, and dissolution of salts could also occur on the alternative sites along Cathedral Bluffs, the spoil piles in these areas would be partly contained by the valleys in which the waste rock would be dumped and no oil-shale resources would not be impacted.

COMMENTS ON THE DRAFT EIS

Page 5, paragraph 2. It is doubtful that the intent of Congress was to impair more oil-shale resources than would be mined on the original prototype lease.

Page 5, last paragraph. From the standpoint of conservation of mineral resources, it would have made more sense to lease an area for waste-rock disposal directly west of the C-b tract, where the oil shale is relatively thin, dawsonite is sparse, nahcolite is absent, and the distance to Cathedral Bluffs shorter if at some future date the spoil piles would be moved to sites west of Cathedral Bluffs.

In the Final Environmental Impact Statement for the Prototype Oil Shale Leasing Program (U.S. Dept. of Interior, 1973, v. 3, p. 3-2 to 3-18), two sites were suggested for disposal of overburden and spent shale from Tract C-a. These sites including Water Gulch just west of Tract C-a and in canyons on the west side of Cathedral Bluffs. The Final EIS (p. 3-15, footnote 1) also stated that disposal sites may include Federal, State, or private lands. Thus, it is implied that the disputed Federal lands along Cathedral Bluffs need not be excluded from consideration as disposal sites for the C-a tract. 15

Page 7, paragraph 6. Because 84 Mesa can accommodate only half of the total waste rock from the Tract C-a if the tract were completely mined, where is the remaining waste rock to go? On another intrabasin site similar to 84 Mesa where additional valuable oil shale would be impaired? This Draft EIS states that it is not concerned with problems of disposal of waste rock beyond 50 years. This approach emphasizes the lack of long-range planning for development of the oil-shale resources in the Piceance Creek Basin. An interagency DOI commission for oil-shale planning and development is clearly needed. 7

Page 52. Corridor right-of-way. The fact that some Federal lands west of Tract C-a are under litigation seems to be immaterial to this Draft EIS. If the Federal Government now owns these lands, then we should (at this time) also be able to lease them. If future events lead to transfer of ownership to the private sector, then the problem can be dealt with at that time. 15

Page 57, Figure 2-24. The open-pit mine in this figure is shown on the northeast side of Tract C-a. In Figure 2-5-3 in the Modification to the Detailed Development Plan, Lurgi Demonstration Project, by Rio Blanco Oil Shale Company (1981), the location of the pit is shown in Dry Fork Gulch in the northwest corner of Tract C-a, where the overburden is thinner. The latter location would mean initially less overburden to move than in the northeast corner of the tract. Why was the location of the open-pit mine changed? It is also noted that the company owns about 440 acres just north of Tract C-a (fig. 11-12 in the Draft EIS). Why was this land not included as a site for waste-disposal or plant facilities in the "no-option alternative"? 16

Page 86, Figure 3-7. This figure is misleading because it does not depict the stratigraphy on any of the proposed disposal sites, but appears to be from one of the Industrial Resources core holes on Federal sodium-lease lands located several miles east of the 84 mesa site. It would be better to use stratigraphy for the C35 core hole in place of this figure. 2

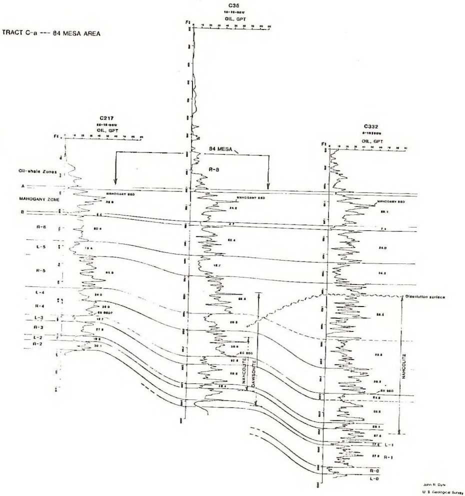
Page 104-105, Mule deer and elk. 84 Mesa is considered a critical winter habitat for our important deer herd, yet at least one of the Cathedral Bluffs sites (Philadelphia Creek) is thought to be minimal range habitat for deer. With the high degree of mining activities, roads, dust, etc., wouldn't the selection of a site west of Cathedral Bluffs minimize the impacts of mining on basin wildlife? 17

Page 300, Figure 4-15. From the viewpoint of conservation of energy resources, this figure, despite the lack of subsurface data, clearly illustrates the tremendous impairment or loss of energy resources that will occur with the selection of the 84 Mesa site. 18

REFERENCES

Beard, T. N., Tait, D. B., and Smith, J. W., 1974, Nahcolite and dawsonite resources in the Green River Formation, Piceance Creek Basin, Colorado, in Guidebook to the Energy Resources of the Piceance Creek Basin, Colorado: Rocky Mountain Association of Geologists, p. 101-109.

Trudell, L. G., 1966, [unpublished] Lithologic description of samples submitted for assays (from U.S. Bureau of Mines Atomic Energy Commission core hole Colorado No. 2), 119 p.



United States Department of the Interior
GEOLOGICAL SURVEY
BOX 25046 M.S. 939
DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY
REFER TO:

Office of Energy and Marine Geology
Branch of Energy Minerals

February 25, 1986

Rec
FEB 28 1986
WRRA

Mr. John Fend, Project Coordinator
Bureau of Land Management
White River Resource Area
P.O. Box 928
Meeker, Colorado 81641

Dear Mr. Fend:

It recently came to my attention that I had overlooked nahcolite and extractable alumina analyses that were made on core samples from the Bureau of Mines-AEC core hole 2 that was drilled on 84 Mesa. These data were published in U.S. Bureau of Mines Report of Investigations 7445.

In reviewing my earlier comments (letter of Dec. 2, 1985, to Mr. Butch Smith), these data would help in determining mineral resources in the vicinity of the well. However, the lack of additional core holes on 84 Mesa, in my opinion, still precludes making reliable resource estimates. This is especially true for nahcolite, because of lack of information on the dissolution surface and mineral-facies changes across the tract.

Sincerely yours,

John R. Dyni

John R. Dyni, Geologist

TELL ERTL FAMILY TRUST
3000 YOUNGFIELD, SUITE 326
LAKEWOOD, COLORADO 80215

JOSEPH L. FOX, CO-TRUSTEE
THEO ERTL, CO-TRUSTEE

RECEIV
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December 3, 1985

Mr. Richard Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P. O. Box 928
Meeker, CO 81641

Dear Mr. Smith:

I have reviewed the draft Environmental Impact Statement relating to the Federal prototype oil shale tract, CA off tract lease and have the following comments:

21 1. Throughout the document references are made to the existance of pre-1920 oil shale mining claims being an impediment to the ability of the present holder of the tract CA lease to utilize either the Philadelphia Creek or Spring Creek alternatives.

As you know, if you read my written remarks at the initial hearing on the draft EIS, I, as agent for the owners of those pre-1920 claims can assure you that there is nothing that we would rather do than to facilitate the orderly development of oil shale for the nations needs. We have cooperated with the BLM in the past in the form of recognizing rights-of-way issued by the BLM for numerous facilities which are presently located upon those troublesome pre-1920 unpatented claims. We claim-owners have generally recovered only a promise from the right-of-way proposer to move his facilities if they cannot be operated in conjunction with an oil shale mine, when that occurs, and a minimal payment which has not covered the legal cost involved in arranging these covering rights-of-way. You may be assured that I would recommend to the owners, and I believe that they would accept, similar arrangements for either the Philadelphia Creek or Spring Creek alternative to the plan which you are intent on approving for the present lease holder.

My comment during the hearing on the draft EIS was that if we had to pick alternatives, we would certainly prefer the Philadelphia Creek alternative since we do have activities programed for the Spring Creek alternative relating to our own troublesome pre-1920 unpatented oil shale claims.

I want to make it clear one more time that either the Spring Creek or the Philadelphia Creek alternative is preferable to the proposed, and now prefered, alternative. We would

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Mr. Richard Smith
December 3, 1985
Page 2

support either one, not in our own selfish interest but rather in the interest of the maximum utilization and availability of resource for America's future energy needs.

2. With respect to America's future energy needs, your own resource analysis as reflected by table II-6 under the Solid Minerals Environmental Consequences indicates as follows:

A. The proposed action will allow recovery of 26% of the oil shale resource and only a 2% loss of 84 Mesa resource.

B. The no-action alternative would result in a 27 - 33% recovery of the shale CA resource when coupled with an underground mining option. However, it indicates that the remaining oil shale resource would be foregone.

This brings forth three rather substantial questions with respect to your choosing of the preferred alternative.

A. Why do you prefer an alternative which recovers less of the resource? 19, 22

B. Why do you conclude, as you do later, that the 84 Mesa resource is not lost because under ground mining can be used. It has to lose as much of a percentage of the resource as the under ground section of no-action on CA proper. 20

C. Why do you conclude that the disposal pile may be removed from the 84 Mesa site but apparently cannot be removed from the CA site. 21

The face of your document indicates that based on energy resource recovery and environmental consequences in the solid minerals area, you have made absolutely the wrong decision.

3. I have enclosed my own resource analysis merely by applying comments to page 300 of your EIS to represent the real trade offs being made here. You may contend, as you have in this analysis, that the 84 mesa resource is fairly simply recoverable merely by moving an average of 560 feet of additional over-burden on top of 1100 feet of over-burden when the time comes to exploit that resource. The simple point is that if either Spring Creek or Philadelphia Creek alternative

12

Mr. Richard Smith
December 3, 1985
Page 3

were used the risk of either economic or engineering unviability of later recovery would be completely removed. The small amount of oil and gas resource and presently unrecoverable coal resource lost is diminimous in relation to the risk of the energy which may be foregone by your prefered alternative. In fact more oil and gas resource is lost by your preferred alternative than Spring Creek and Philadelphia Creek combined (Gad-zooks! - another alternative not considered by the BLM which could double the potential recovery from CA.) 12

I hereby request that these comments and my enclosed resource analysis be included as a part of the final of EIS when issued.

Thank you for your consideration.

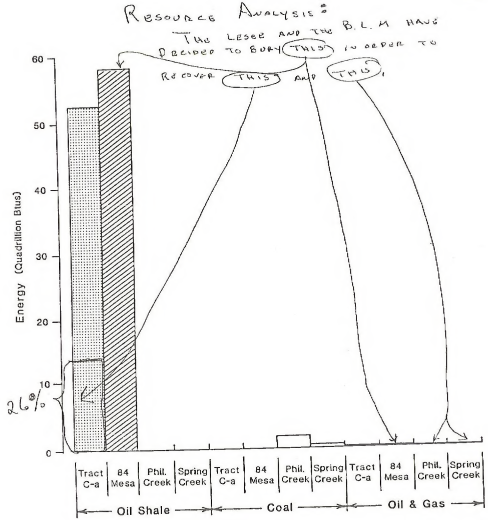
Yours very truly,

Joseph L. Fox

JLF:seh

Enclosures

12



RESOURCE ANALYSIS:

THE LESEE AND THE B.L.M HAVE DECIDED TO BURY THIS IN ORDER TO RECOVER THIS AND THIS,

26%

Figure IV-15.. Comparison of Total Energy Resources for Tract C-a and Each of the Offtract Disposal Alternatives.

James H. Brannigan
Vice President
Research

**Marathon
Oil Company**

P.O. Box 269
Littleton, Colorado 80160
Telephone 303/794-2601

December 4, 1985

Mr. Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P. O. Box 928
Meeker, Colorado 81641

Dear Mr. Smith:

There are enclosed for filing two copies of Marathon Oil Company's objections to the September 1985 Draft Environmental Impact Statement for an offtract lease for Federal Prototype Oil Shale Tract C-a.

I should appreciate it very much if we could set a meeting with you and your staff at the appropriate time to discuss our objections further.

Sincerely,

James H. Brannigan

James H. Brannigan

JHB:dhm

Enclosures

cc: Kannon Richards

IN THE DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WHITE RIVER RESOURCE AREA
CRAIG DISTRICT OFFICE

MARATHON OIL COMPANY'S OBJECTIONS
to the
Draft Environmental Impact Statement
for Offtract Lease to Federal Prototype
Oil Shale Tract C-a

INTRODUCTION

Pursuant to the notice of availability published October 4, 1985 (INT DES 85-43; 50 F. R. 40612) Marathon Oil Company objects to the Draft Environmental Impact Statement (DEIS) for an offtract lease for Federal Prototype Oil Shale Tract C-a and the issuance of an "offsite lease" under Section 21(d) of the Mineral Leasing Act of February 25, 1920, 41 Stat. 437; 30 U.S.C. 241(d), as added by Section 318 of the Act of December 30, 1982 (96 Stat. 1980; P.L. 97-394) for the reasons stated below.

Statement of Reasons

1. No reliable mineral or resource evaluation of the proposed offsite lease area has been made; 5, 9

2. No evaluation of the competing interests or conflicting claims of others to portions of the proposed offsite lease area has been made; 23

3. No complete assessment of alternative offsite lease areas has been made; and 24

4. No justifiable reason has been advanced for concluding that a specific 1,363 acres of "common area" adjacent to Tract C-a must be part of any offsite lease area, regardless of where the waste material is dumped. 25

ARGUMENT

1. No mineral or resource evaluation has been made. A confusing and inconsistent picture of administrative action is presented in the DEIS. First, the "proposed action" is the offsite lease application of the Rio Blanco Oil Shale Company (RBOSC) filed August 15, 1983 (C-37744) for about 6,400 acres mostly on an area known as 84 Mesa; second, the "primary" purpose of the DEIS is "to identify potential environmental impacts anticipated from" issuing an offsite lease to RBOSC "and alternatives" (DEIS, pp. 5-7); and, third, that the "main focus" is to assess the consequences of dumping waste on public lands (DEIS, p. 1).

From the outset, the DEIS appears geared to support only the RBOSC application for a waste disposal lease on 84 Mesa and to reject all other alternatives. It looks like it was written to sustain a predetermined result. As such, the DEIS is deficient in that no evaluation of mineral resources has been made of the proposed RBOSC offsite lease area (Cf., DEIS, p. 7), and to the extent evaluation is mentioned at all, the District

Office admits that no monetary value was assigned to the offsite lease area because the offsite lease may run for more than 50 years and values may change (DEIS, p. 7).

The DEIS does not address the full 10.5 to 12 billion cubic yards of waste disposal needs for RBOSC Tract C-a because the 50 year offsite lease will only hold about 3.6 billion cubic yards with a minor 200 million (1/18th) returned to the open pit mine (DEIS, p. 7). In fact, the 6,400 acres is apparently not large enough to start with since such things as drainage from the offsite lease area would be directed north to Duck Creek and south to Corral Gulch over lands not owned by the United States or RBOSC (DEIS, p. 36).

The error the District Office is caught in is its adoption of the "on" as opposed to "off" significant resource test for issuance of the lease (DEIS, p. 2). An offsite lease for waste disposal on 84 Mesa will cover up forever at least 10 billion barrels of shale oil - a choice the District Office sluffs off as an "opportunity cost." The selection of 84 Mesa as the Preferred Alternative seems predicated on the assumption that a disposal site "on" the oil shale area is merely giving up the potential of Federal oil shale in 6,400 acres of 84 Mesa for the potential of the 5,120 acres of Tract C-a. This trade, charitably called an "opportunity cost" (DEIS, p. 2), is simply the opportunity to go forward, at some future date perhaps, on Tract C-a and forget the opportunity to go forward on 84 Mesa forever. If that is the case, the loss of 10 billion barrels of shale oil potential on 84 Mesa is the cost of the "opportunity" to develop about 26%

of the oil shale barrels on Tract C-a -- or about 1.3 billion barrels (DEIS, pp. 25, 68, 87). The opportunity to lose resources at about a 10 to 1 ratio seems inherently wrong. An "opportunity" to lose 10-12 billion barrels of shale oil in 84 Mesa for the potential recovery of 26% of Tract C-a shale oil or some 1.3 billion of 5.3 billion barrels of estimated shale oil (DEIS, p. 25) is simply too great a cost.

The District Office's conclusion that there would be no loss of oil shale in 84 Mesa because the waste and spoil pile would be moved (DEIS, p. 66) is an illogical assumption and is inconsistent with its own preferred analysis which shows that only 200 million cubic yards out of some 3.6 billion cubic yards would be put back in the Tract C-a open pit (DEIS, p. 7). We note that the District Office states a caveat that any offsite waste dump lease would call for market value rental "including an evaluation of mineral values foregone" (DEIS, p. 2). These inconsistencies demand a complete mineral evaluation of 84 Mesa.

a. There is insufficient evidence in the DEIS for a proper evaluation. Everyone knows that only one core hole has been drilled on 84 Mesa (United States Bureau of Mines - Atomic Energy Commission Duck Creek No. 2; DEIS, p. 87). According to the DEIS, that hole (located in NW^{4}NE^4, sec. 14, T. 1 S., R. 99 W.) shows a section of 1,340 feet of continuous oil shale averaging "at least 8 gallons of shale oil per ton" beginning at 630 feet or almost 2.4 million barrels per surface acre (DEIS, p. 87).

The reference to 8 gallons per ton is misleading and we object strongly to tying the 8 gallon per ton statement to AEC - USBM Duck Creek No. 2. We are not certain whether the District Office wants the public to infer that 8 gallon per ton oil shale is a viable commercial resource. We are certain however that the Department of the Interior has established some 20 gallons per ton as the minimum grade for mineable oil shales (Cf., Prototype Oil Shale Lease Agreement, 38 Fed. Reg. 33189 - 91; 12 cents per ton royalty less 1 cent per gallon for each ton below 30 gallons; minimum 4 cents per ton; or 12-4 = 8 gallons per ton; 30 gpt - 8 = 22 gpt.)

What strikes us as equally important is the effort of the District Office to have us believe that the Tract C-a oil shale is comparable to that underlying 84 Mesa (DEIS, p. 87). This effort based only on the Duck Creek No. 2 test. The facts are otherwise. The shale oil beneath 84 Mesa is of better mineable quality than the shale oil in Tract C-a.

We base our factual case on the open file assay data of the United States Geological Survey (See Exhibit 16, USGS assay values). This assay data (meaning the average assay in gallons per ton of all oil shale in sections at least 10 feet thick), taken from four coreholes through Tract C-a to Duck Creek No. 2 (See Exhibit 3 for location) show the mineable grade oil grade become increasingly richer and thicker across Tract C-a and into 84 Mesa (Exhibit 16). For example, there is 1102.3 feet of 20 gallon oil shale shown in Duck Creek No. 2 and there is only 684.3 feet in Amoco No. 3 (See Exhibits 3, 9 for locations). The contrast is even greater for 30 gallon shale oil and on 84 Mesa almost one half of the shale oil volume is 40 gallons per ton (Exhibit 16).

What the DEIS does not show for Duck Creek No. 2 is that (1) the hole caught fire and the corebarrel and drill stem were lost at 2,214 feet; (2) the total depth of Duck Creek No. 2 even after re-entry did not go as deep as the "orange marker" which is about 2,580 feet (Cf., Exhibit 1); and (3) the entire oil shale interval to a depth of about 2,700 feet was not cut in this hole. Stated simply, since Duck Creek No. 2 did not cut the entire oil shale section, no total estimate of oil shale value can be made from this test, even with the high quality results noted above (See Exhibit 16).

To substantiate our point, there are annexed Exhibits 2 through 6 showing cross sections from available core data near 84 Mesa and Tracts C-a and C-b as well as the tops and bases of the shale zones in the area. What this evidence clearly demonstrates is that 84 Mesa is largely undefined and untested in the lower oil shale zones; that the over burden is clearly in the mineable category (Exhibits 2-5); and that the oil shale section in 84 Mesa is richer and thicker than on leased Tracts C-a and C-b (Exhibits 5-6). No similar analysis that we can find was made in the DEIS.

b. No action should be taken until a comparable loss analysis is prepared. It is not sufficient for the District Office to conclude that loss of 84 Mesa is a trade-off for alternative energy and development of the Prototype Program. More than a decade has passed since the assumptions of that program were made (Cf., DEIS, p. 67). Needless to say, times have changed and oil shale development under that program is remote to say the least (DEIS, pp. 25, 59, 66-7). Until such time as a proper loss analysis is made, no action should be taken by the District Office to go forward with the offsite lease or the Preferred Alternative.

To prove the point, there are annexed Exhibits 7-9 (List of Exhibits, maps labeled 1, 2 and 3 for identification), based on USGS quadrangle sheets and BLM township plats, depicting the lands leased as Tract C-a; the RBOSC proposed offsite lease for 84 Mesa; Marathon Oil Company's fee and other mineral interests; and all the core holes drilled in the area. What this evidence clearly shows is that the issuance of an offsite waste disposal lease will (a) condemn and contaminate all of 84 Mesa and more without sufficient appraisement data (Exhibits 7-9, maps 1-3; DEIS pp. 5, 8, 65); (b) destroy the value of resources not owned by the United States or RBOSC (Exhibit 9, map 3); and (c) eliminate an area approximately three times the size of the 84 Mesa waste dump site from open pit oil shale running and recovery (Exhibit 9, map 3). By this action the District Office may subject the United States to liability for the taking of private property without just compensation.

So far as we can determine, the District Office has paid lip service only to the evidence and opinions demonstrating that the oil shale in 84 Mesa would be lost forever (Cf. DEIS, pp. 66, 323). We renew our objections and demonstrate again that, in our view as well as the views of the Department of the Interior's own mineral advisors, at least 10-11.5 billion barrels of shale oil are forever lost as a public energy resource

(Exhibits 10-13). Until a proper comparable loss analysis is made and explained in evaluation terms other than a "trade off" "opportunity", no action to implement the Preferred Alternative can be taken.

The record before the Bureau is replete with documented proof that the 1,000 feet of rubble piled on 84 Mesa will condemn and as a practical matter eliminate forever about 11.5 billion barrels of shale oil from the nation's energy base and prevent open pit oil shale mining on a much larger area (Exhibit 9, map 3; Exhibits 10-13). That should certainly never be the Federal policy for the cost of the "opportunity" to develop Tract C-a under the Federal prototype oil shale leasing program which, as the Bureau so accurately says cannot be "considered commercial at this time or in the foreseeable future" (DEIS, p. 67).

2. Competing interests and conflicting claims have not been evaluated. No evaluation of the competing interests or conflicting claims of others to portions of the proposed offsite lease area and surrounding lands has been made. Despite statements in the DEIS to the contrary (DEIS, p. 9), no consideration has been given to competing and conflicting claims and interests in the areas surrounding the proposed offsite lease. Although Marathon's pending land exchange application is frequently mentioned (Cf., DEIS, pp. 1, 124, Figure III-23, 127) with the notation that a public interest statement and environmental assessment are being prepared (idem), no comparison of interests whatsoever, whether environmental, resource, financial or public, is made. We, in fairness, point out that action on the exchange application is, at our request, under suspension, as is RBOSC's Tract C-a lease operations at its request.

We search in vain to find whether the United States would be in a better or worse position in granting to RBOSC an offsite lease as requested, or in exchanging lands with Marathon covering perhaps some of the same area, or in the effect of the Preferred Alternative on unadjudicated but obviously lands not owned by the United States which will be affected by the proposed actions, such as the so-called "common area" (Cf., DEIS, pp. 9,14-15, 87, 127).

What has not been done is to determine (a) the effect of the ownership by Marathon and others and the offer by Marathon to exchange with the United States an undivided interest in some 600 acres of all minerals except oil and gas and oil shale located partly within Tract C-a and partly within the so-called "common area"; (b) the effect of the claims by Marathon through its application for exchange to an overlap of about 1,560 acres, including 200 acres owned in part by RBOSC in the "common area" in which Marathon may seek title depending on the exchange; and (c) the conflict with previous determinations that a portion of the proposed offsite lease area is within the open pit mining zone.

The District Office has already recognized that lands within the "common area" immediately adjacent to the north and west boundaries of Tract C-a and the proposed offsite lease area are "within the open pit zone" and that commitment of those lands for "facilities siting and overburden disposal would tie up access to oil shale and other minerals for an extended period of time, possibly exceeding 100 years" (Decision, C-37765, May 22, 1984; Brief, p.5 "Resource Analysis"). If that area was part of the adjudicated open pit mining area then, it is part of it today.

The District Office errs when it recognizes the problem of the lost oil shale resources of the United States under the 84 Mesa waste dump (DEIS, pp. 66, 323), which losses are described as the "opportunity cost" for "the trade-off involved in development of an alternative energy source for the nation" (DEIS, p. 66), but gives no consideration to losses of other interests not owned by the United States or the different values between Tract C-a and 84 Mesa (supra, pp. 5-7).

3. No complete assessment of alternative disposal areas has been made. Once again the District Office's error is in selecting the "on" over the "off" the substantial resource area (supra, p. 3-7). We believe that the consideration given to Philadelphia Creek was not complete (DEIS, pp. 16-17, 49, 197, 215-6). We note that the favorable factors for both RBOSC Tract C-a and the Philadelphia Creek alternative exceed those for 84 Mesa in that (a) there is a higher percentage recovery of oil shale on Philadelphia Creek (32% versus 26%; DEIS, pp. 49, 68); (b) that a comparable conveyor transport system is required for both areas (maximum 5.7 miles versus 6.2 miles; DEIS, pp. 25,49,68); and (c) there will be far less loss of the resource base of the United States at Philadelphia Creek (DEIS, pp. 68, 87, 89).

What seems of primary concern to the District Office is its present inability to guarantee transportation access by the United States to Philadelphia Creek (DEIS, p. 49). We too have considered the problem and believe there is a solution to it.

We are impressed with the ability and manner in which RBOSC obtained its legislation for the offsite lease (see 128 Cong. Rec. pp. S14445-S14450, December 13, 1982). We would join with RBOSC and the Department of the Interior in obtaining right-of-way or other appropriate condemnation legislative which will make certain the transportation corridor to Philadelphia Creek is secured for the Tract C-a operator and others who want to develop oil shale in that area.

4. The necessity for the "common area" has not been proved. There is an assumption that 1,363 acres adjoining Tract C-a on the north are absolutely necessary for development of that oil shale lease (DEIS, pp. 9, 14-15, 27, 49, 124-7). The assumption is wrong.

We would start by saying that, for all intents and purposes, the "common area" has already been adjudicated as favorable for open pit oil shale mining (supra, p. 8; DEIS, p. 87). The overburden is thin (50-700 feet) and the oil shale barrels substantial (1 - 2.5 million barrels per acre)(DEIS, p. 87). A sufficient number of coreholes have been sunk along the northern boundary of Tract C-a, and to the west and east as well, all of which give a far better resource analysis base than for 84 Mesa proper (Exhibits 14, 15; DEIS, p. 9, 14, 27, 49, 124-7). There is simply no rational basis for granting a "temporary" 50-year lease to an adjudicated area of oil shale open pit mining and preventing its mineral utilization as a "common area". In addition, earlier versions by RBOSC for development of Tract C-a had a different yet equally appealing approach for access to 84 Mesa (Exhibit 14, p. 2-32; Exhibit 15, pp. 28-30).

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What is most disturbing is that by granting a "forever" offsite lease to the so-called "common area" (DEIS, pp. 10, 14, 37) the District Office ignores the fact that (a) Marathon Oil Company owns minerals other than oil shale and oil and gas within that area as well as the RBOSC surface acreage intermingled in it and in Tract C-a also (Exhibit 9); and (b) as recognized by the District Office an isolated tract of 720 acres owned by the United States will be administratively segregated with no rational basis for creation or use (DEIS, pp. 127, 250). There is no Federal law, policy, or administrative practice or procedure which authorizes such action.

CONCLUSION

For the reasons stated above, the DEIS should be suspended and the District Office should reconsider the Preferred Alternative as suggested and find an offsite lease area other than 84 Mesa as the Preferred Alternative. Further, Marathon Oil Company requests an opportunity for presentation before the District Office of its evidence and objections to the DEIS.

Respectively submitted,

MARATHON OIL COMPANY

Of Counsel

John S. White
Marathon Oil Company
1800 M Street, N.W.
Suite 975N
Washington, D.C. 20036

14

COLORADO DEPARTMENT OF HEALTH
Richard D. Lamm
Governor
Frank A. Traylor, M.D.
Executive Director

DATE: December 2, 1985

SUBJECT: NON-STATE ASSISTANCE

REVIEW AND COMMENTS

TO: Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P.O. Box 928
Meeker, CO 81641

PROJECT TITLE: C-a off-tract lease

STATE IDENTIFIER:

COMMENTS DUE: Dec. 9, 1985

COMMENTS: Air Pollution Control Division - See attached comments.

Thomas M. Tayon for
Name, Title
Thomas P. Looby
Environmental Programs Administrator

SCC-3, Jan 81

COLORADO DEPARTMENT OF HEALTH
Division or Section of Air Pollution Control - Adm.

INTER-OFFICE COMMUNICATION

TO : Steve Norris,
Dept. of Nat. Resources JEP

FROM: Ray Mohr, APCD Ray Mohr

DATE : November 27, 1985

SUBJECT: APCD Comments on C-a off-tract lease DEIS

The APCD staff has reviewed the DEIS. In general, the Division does not have elaborate or detailed comments. The most significant comment revolves around the use of the TAPPAS system for estimating long term impacts on distant receptors. The comments are attached.

RM/vf
Attachments

DRAFT

MEMORANDUM

TO: Ray Mohr

FROM: John Plog JP

DATE: 11/15/85

SUBJECT: Document Review: Tract C-a Offtract Lease DEIS

The subject DEIS has provided a comprehensive and adequate assessment of air quality impacts and air quality related values (visibility and acid deposition) by the R.B.O.S.C. C-a tract oil shale development activities. In addition, the cumulative impact by other proposed oil shale and licensed energy production and mining activities appear to be adequately addressed in the immediate impact area including federal Class I and Colorado Category I areas.

It is not clear if the emissions from construction and operation of an offtract disposal site is included in the impact assessment on Class I 28
and Category I areas as reported on page 188 of the DEIS. In any event fugitive emissions from the offtract lease sites, preferred and alternatives, should be analyzed and reported separately as well as cumulatively to properly assess the environmental impacts of each. 26

On Page 7 of the EIS Scope, the size of the offtract disposal sites are admittedly too small to fully develop the C-a tract for oil shale production. A tract capable of handling up to 12 billion cubic yards of disposal material is stated. Consequently it is not clear if the long term impact is from a scaled down oil shale development program to accommodate a limited size disposal area or from a full scale oil shale development program over a shorter project life. 26

cc: J. Geier

14

Colorado Department of Health
Air Pollution Control Division
INTER-OFFICE COMMUNICATION

TO: Ray Mohr DATE: October 21, 1985

FROM: Alan Dresser SUBJECT: C-a OFF-tract Deis

A.D

Use of TAPPAS - It has been our experience that there are some limitations on the use of the TAPPAS system for estimating long-range impacts in western Colorado. The winds model is only two-dimensional. This means the model assumes that at the top of the mixing layer the vertical velocity is zero, and that at ground level the vertical velocity component is given by a flow parallel with the surface. This approximation fails in areas of where the topography is steep because unrealistically large velocities parallel to the surface are generated, resulting in high divergence fields. To a large extent steep terrain surrounds Colorado National Monument (Category 1) and Flat Tops Wilderness Area (Class 1). Therefore, as plumes approach these areas the winds model will cause them to diverge rapidly away. In many cases this will be unrealistic plume behavior. Other factors which will cause at least a portion of the plume to move up the terrain, such as upslope winds, are ignored by the winds model. This implies that TAPPAS may be underestimating impacts at the Class 1 and Category 1 areas. 27

AD:tb

15

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
655 Parfet Street
P.O. Box 25287
Denver, Colorado 80225

IN REPLY REFER TO:

L7619 (RMR-PP)

DEC 6 1985

Memorandum

To: Project Coordinator, Bureau of Land Management, White River Resource Area, Meeker, Colorado

From: Associate Regional Director, Planning and Resource Preservation, Rocky Mountain Region

Subject: Draft Environmental Impact Statement, Federal Prototype Oil Shale Tract C-a

We have reviewed the subject document and have determined that the proposed offtract disposal of waste materials will have no effect on lands or programs administered by the National Park Service.

Richard A. Strait

December 5, 1985
3035 Osceola St.
Denver, Colorado 80212

Mr Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
PO Box 928
Meeker, Colorado 81641

Dear Mr. Smith:

I appreciate this opportunity to comment on the "Federal Prototype Oil Shale Tract C-A Offtract Lease Environmental Impact Statement". The 6400 acre 84 Mesa site represents a spectacular piece of real estate. Below the surface of this 6400 acre piece of land are roughly 16 billion barrels of oil shale resource, 500 million tons of the potentially valuable sodium mineral called nahcolite, and 400 million tons of the aluminum mineral called dawsonite. The 16 billion barrels of oil shale resource exceed 3 years of total US crudeoil consumption, based on 1984 estimates. In terms of total US consumption, the two mineral resources from the 6400 acre tract are even more impressive.

Reasonable, diligent-development requirements for leasing such a resource-rich piece of real estate should, at a minimum, require the oil company's commitment to a realistic and determined development schedule. Such a development schedule should be based upon a successfully tested, large retort (1000 tons per day or larger). 6

The selection process for the preferred alternative relies upon a casual commitment by an oil company to do some sort of development at some future and uncommited date in exchange for a legally executed lease to a spectacular piece of real estate owned by the US Government.

The BLM should note that the remaining acerage of comparably resource-rich oil shale land in the whole world is limited to only enough additional acreage to provide only about 20 more tracts of similar size. This land is also located in the Piceance Basin.

In conclusion, the preferred alternative should appropriately delay such an important decision until the oil company is ready to make a determined commitment to proceed with development. Then, the BLM should be better prepared to make a land management decision that is more clearly in the public's interest. 29

Simply stated, I am concerned about the loss of land management options before the government is assurred of an appropriate and diligent commitment for development by the oil company. Equally important is the fact that evaluation of the environmental effects of development are seriously impared, because process parameters are vague or unknown.

Sincerely,
Anita Johnson
Anita Johnson

JOHN R. DONNELL
Oil-Shale Consultant
6035 So. Milwaukee Way
Littleton, Colorado 80121

(303) 798-1168

December 5, 1985

Mr. Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P. O. Box 928
Meeker, Colorado 81641

Re: C-a Offtract Lease
DEIS

Dear Mr. Smith:

On page 7 of the DEIS, under "Scope of the EIS," you correctly assert: "Many public concerns centered on the potential loss of oil shale resources that could be the result of surface waste disposal on 84 Mesa." The DEIS does not adequately address this issue, nor does it cite analytical data that are publicly available — such as geologic maps of the 84 Mesa and Tract C-a areas with geologic cross sections, oil shale histograms, etc. 9

The EIS is being prepared because of a proposed action that involves a long-term (50+ years) mining and processing operation that will result in major impacts on the mineral resource of not only the area being mined, but also the area upon which solid waste is being disposed. The space allocated to mineral resources is not consistent with the relative importance of these resources.

The in place shale oil resource underlying 84 Mesa is listed in Table IV-10 (page 200) as 10 billion barrels. The table should clearly state the parameters used (viz. 4,000 acres and yields of 8 GPT or more). 22

On page 87, the DEIS cites "Beard, Tait, and Smith; 1974." From this citation, the DEIS assumes sodium minerals of 75 million tons of nahcolite and 60 million tons of dawsonite per square mile. Superimposing 84 Mesa on Figures 8 and 11 in Beard, Tait, and Smith, indicates the nahcolite resource is closer to 100 million tons/sq.mi. and the dawsonite resource, 80 million tons/sq.mi. — see accompanying illustrations. 22

The use of 84 Mesa as a solid waste disposal site is being evaluated solely with relation to operations on Tract C-a rather than on a large integrated surface mining operation possibly involving several open pits. While this kind of analysis may satisfy the narrow requirements of the DEIS, a better analysis could be based on basin-wide open pit development. 7 According to U.S. Bureau of Mines report "Technical and Cost Evaluation of Candidate Large-Scale Open Pit Oil Shale Mining Methods in Colorado" (July 1976), one pit might be initiated in Big Duck Creek about 1.5 miles northwest of Tract C-a. Here the Mahogany ledge and the upper R-6 Zone are exposed and would provide immediate access to ore. A logical extension of the original pit would be to the east in the direction that the oil shales thicken and become richer. Even though the overburden increases to the east across 84 Mesa to an average of 1,100 feet, the waste-to-ore ratio would be a favorable 1-to-1 or less. A surface mine limited to the confines of 84 Mesa (as analyzed in the DEIS) probably would not be economically sound. However, as the eastern extension of an open pit starting in Big Duck Creek, surface mining of 84 Mesa would probably be considered both technically and economically feasible.

The solid mineral recoverable resources listed in Table IV-10 (page 200) are 56 percent of the in place resource figures and are based on an open pit mine restricted to 4,000 acres at 84 Mesa. In contrast, as part of a continuing eastward-moving surface mining operation, essentially 100 percent of the resource could be recovered. 30

Disposal on 84 Mesa of solid waste from Tract C-a averaging 580 feet in thickness would result in an unfavorable waste-to-ore ratio of more than 1-to-1 and probably make any oil shale mining operation uneconomical. 5

For the 6,400-acre tract, the underlying resources are 16 billion barrels of shale oil, 1 billion tons of nahcolite, and 800 million tons of dawsonite. The in-place resource underlying the 4,000 acres of 84 Mesa being considered for solid waste disposal totals 10 billion barrels of shale oil, 625 million tons of nahcolite, and 500 million tons of dawsonite.

Other Comments

The map scales are incorrect on Figures II-23, II-24, and II-25. — 2

The Net Energy Analysis (pages 297 through 299) is not a true analysis. Your attention is invited to the net energy analyses that appear in the EIS for the Mobil-Pacific Oil Shale Projects (BLM, 1984). 18

On page 87, it is stated (under "Proposed Action") that in U.S. BOM's Duck Creek No. 2 corehole the oil shale resources average at least 8 GPT in a continuous interval 1,340 feet thick. Although true, this gives an erroneous impression of the value of the resource. The interval actually averages more than 20 GPT. 22

Very truly yours,

John R. Donnell

Enclosure:

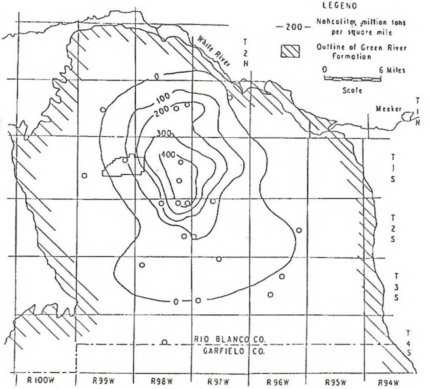

Figure 8. Nahcolite isoreserves in nahcolite-bearing interval, in millions of tons per sq mi.

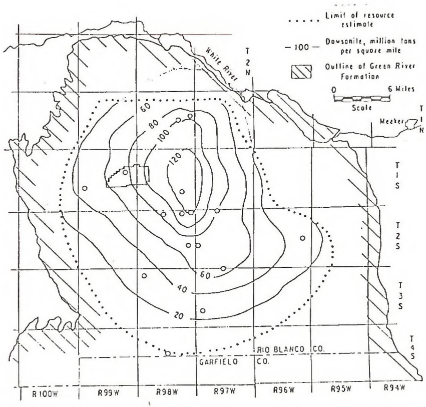

Figure 11. Dawsonite isoreserves in dawsonite-bearing interval, in millions of tons per sq mi.

FRIENDS OF THE EARTH
P.O. Box 728
Palisade, CO 81526
(303) 464-5329

December 7, 1985

Mr. Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P.O. Box 928
Meeker, CO 81641

Dear Mr. Smith:

The following comments on the Draft Environmental Impact Statement for Federal Prototype Oil Shale Tract C-A Offtract Lease are submitted on behalf of Friends of the Earth.

This DEIS is one of the most biased and incomplete EIS's that I have ever reviewed. It blatantly reflects the "needs" of the corporate propopent, Rio Blanco Oil Shale Company, to such a degree that it doesn't even begin to be an objective analytical document which meets NEPA standards. It is a shoddy document done to justify a giveaway of public lands and associated resources to two major oil companies. In fact, the history of the proposed off-tract lease is remarkable from the standpoint of the number of tactics that RBOSC has employed to obtain more land for an essentially defunct oil shale project. This has included passage of special federal legislation authorizing an off-tract lease solely for RBOSC, and more recently attempts to expedite a land exchange and avoid royalty payments. The DEIS is merely the current attempt in a quite obvious long-term agenda to obtain public resources without regard to the environmental consequences or lack of economic return to the public. The DEIS clearly exhibits this bias and I believe it violates NEPA on a number of levels. BLM has put itself in a legally indefensible position of proposing to give away public land without an adequate analysis of the consequences.

UNDUE INFLUENCE ON DEIS BY RBSOC

The DEIS preparation team had at least seven people from RBOSC; this is an unusually high proportion of corporate personnel involved in formulation of the DEIS compared to other similar EIS's which I have reviewed. Usually corporate personnel provide studies and data, and the contractor and/or lead agency do the actual analysis and drafting of the document. While RBOSC staff may have expertise in oil shale technology or engineering they do not have the qualifications or the charge to develop alternatives, evaluate environmental consequences, and draft language for a DEIS. The lack of qualifications on the part of RBOSC personnel combined with the absence of an independent contractor, are in large part responsible for the extreme bias exhibited in the DEIS in regards to the misinformation on the preferred alternative; lack of analysis of other alternatives; lack of referencing of existing and relevant studies. (The BLM must also be taken to task for allowing the EIS to proceed in this manner.) 31

In order to clarify the role of the RBOSC personnel in the preparation of the DEIS I recommend that under NEPA Regulations Part 1502.07 the people responsible for the specific sections in the EIS be identified in the future documents on this EIS.

Another cause for concern about the reason for extreme bias in the DEIS is the fact that a team of BLM specialists along with a representative of RBOSC was assembled into a "scoping committee to select the best alternative sites to the proposed site." (See page 9.) This is a rather unusual action which I have not seen in other EIS processes. Normally, scoping under NEPA regulations is a specific function which occurs as part of the public participation process to determine issues to be addressed in the EIS. This scoping committee obviously was not an announced public function. I also find it highly objectionable that RBOSC was included but no representative of environmental or public interest organizations was notified as to this scoping exercise. Additionally, the DEIS cites the Craig District Advisory Council has having a hand in advising on alternative sites, Not only is this Council well-known for its rubber-stamping of BLM's pro-development policies, I also suspect that RBOSC had some level of participation on the Council. Again this input on the DEIS was solicited without any attempt at public process or notification. Throughout this whole process RBOSC has always insisted that 84 Mesa is the only alternative which they are interested in pursuing for the disposal of spent shale. Therefore, given the level of input outside of the public process and the actual involvement of RBOSC personnel in formulation of the EIS, it is not surprising numerous statement throughout the EIS claim that 84 Mesa is the only viable alternative, e.g. on page 66 the following statement that "only 84 Mesa offers the opportunity to contain surface disturbances to areas continguous to mining operations on Tract C-A." 32

In order to bring this DEIS into compliance with NEPA I suggest the following actions: (a) all such blatantly biased statements reflect the agenda of RBSOC be stricken from the EIS, (b) the alternatives must be revamped-- additional suggestions will be detailed below, (c) all scoping commitee and adivisory council meetings, with dates, names and affiliations of participants, and the input from RBOSC should be included in future documents.

INADEQUATE ALTERNATIVES VIOLATE NEPA REQUIREMENTS

The most blatant example of manipulation of the DEIS in order to grant RBOSC whatever they want is the exclusion of the 1363-Acre parcel adjacent to the C-A tract from any comparative analysis. 25 It is simply presumed that this parcel will be part of the off-tract lease involving 84 Mesa; no alternatives to the parcel are examined; and it is simply carried through as a given in the other alternatives. This is justified on pp. 9 and 49 by citing its close proximity to the mine as necessary for operating efficiency! This is an outrageous predetermined giveaway of 1363 acres of public land (on which placement of facilities will create significant impacts, and which is a portion of the lease which is the subject of the EIS) in order to give RBOSC additional land for the operations facilities so they can mine more of their lease tract! This lack of analysis of alternatives, impacts, and consequences constitutes a clear violation of NEPA Regulations Part 1502.7 since the EIS does not provide any clear choice among options.

The criteria utilized in the elimination of alternatives were not uniformly and fairly applied. For example, a number of alternate sites for shale disposal were eliminated on the grounds of not meeting the criteria of "off significant oil shale resources" while the preferred alternative, ie. 84 Mesa, obviously does not meet this criteria. 33

In addition to the elimination of potential alternatives cited above the EIS doesn't even pretend to consider other alternatives which are reasonable and practical given the state of the art of the technology. This makes the DEIS so structurally, and therefore legally, deficient from the standpoint of the number and types of alternatives that it must be totally redone to meet NEPA standards. Major omissions regarding alternatives are:

1) No technology other than open pit on C-A tract was included even though the DEIS admits that RBOSC may change its selection of technology. (And no, the DDP will not suffice to deal with a change in technology because DDPs do not deal with choices and alternatives involving the impacts on public lands, leasing.)

2) The option of backfilling spent shale into the open pit mine was not considered.

3) Some combination of open-pit and underground mining on C-A tract was not included even though it would offer greater resource recovery and less environmental impacts.

4) The possibility of disposing of some of the waste on C-A tract before proceeding with shale disposal on an alternate site was not included. 34

Within the analysis of the alternatives included in the DEIS are problems too numerous to mention--contradictory information, statements without factual basis, and unmitigated focus on waste disposal issues to the point of exclusion of other concerns, are the generic problems pervading the EIS. The end result was dismissing the Philadelphia and Spring Creek alternatives by unfairly applying criteria, or utilizing irrelevant factors to make 84 Mesa appear as the viable alternative. For example, the topography of the various alternatives would be a minor factor in controlling leachates in comparison to the type of disposal technology to be utilized, yet one of the consistent statements attempting to justify 84 Mesa as the preferred alternative was its less rugged topography, with an accompanying dismissal of the greater wildlife and groundwater resources associated with 84 Mesa. This DEIS must be redone to do a factual and fair analysis of alternatives. Furthermore, the no action alternative should be elevated to the point of being a viable alternative, since the state of the oil shale industry, coupled with the lack of commitment on the part of RBOSC to lift the suspension and restart the project, does not constitute an urgent need for an off-tract lease.

LACK OF ANALYSIS OF ECONOMICS AND LOSS OF RESOURCES

The issue of destroying other resources on 84 Mesa (oil shale, nacholite, gas, groundwater) in order to dispose of spent shale is given cursory acknowledgement in the DEIS in spite of scoping concerns to the contrary. Additionally, it appears that the Philadelphia and Springs Creek alternatives would involve less destruction and impacts on these other resources. Yet no economic analysis and comparison was done in the DEIS to determine the monetary impacts to the federal government. 5, 9, 12, 14, 20

As an example, there are the ludicrous and contradictory arguements that shale disposal would ruin a resource (oil shale) on C-A tract, but would not interfere with oil shale on 84 Mesa! In the draft EA on page 10, RBOSC stated that "on-tract, permanent disposal . . would result in a loss of approximately one-half of the recoverable oil shale resources." It acknowledges the possibility of open pit mining the area after moving the spent shale to another area but says: "double moving of billions of cubicyards of disposal materials is not considered economically feasible." Yet a similar quantification of lost resource and the problematic issue of moving disposal piles is not only lacking in regards to the preferred alternative, 84 Mesa, the BLM and RBOSC actually have the gall to claim that there could be zero loss of the oil shale resource if open pit mining and moving the pile were employed (see page 66)! The DEIS must contain consistent economic criteria applied to all of the alternatives if it is to have any credibility.

The DEIS does not determine the lost value of the resources, nor conduct a comparative analysis of the economic effects of the various alternatives. The lack of any calculations and comparisons is an inconsistency in BLM's practise and procedures. To illustrate, over the past couple of years the BLM has had several companies attempt to initiate land exchanges involving BLM oil shale lands. In each case the BLM conducted an analysis which included estimates of the value of the oil shale resources involved, and in all cases deemed that the exchange was not in the public interest, in large part because of the amount and value of oil shale. In this DEIS the public's interest is ignored; RBOSC is given favored treatment by the BLM due to the lack of analysis of economic effects which could throw a different light on the preferred alternative. 35

The lack of economic analysis constitutes several probable violations. First of all it does not respond to the NEPA directive to respond to scoping concerns on significant issues. Secondly, it does not heed the provision in the amendment authorizing the off-tract lease (Sec. 318, (d)(2)) which directs the Secretary to consider "impacts on the environment and other resources" EMPHASIS ADDED. A similar reference (c) (4) says the Secretary must also consider the public interest. Thirdly, it does not include the cost-benefit analysis of the alternatives per NEPA regulations, Part 1502.23. Nor is any economic analysis referenced or appended in the DEIS even though a report by Golder and Associates was submitted to the BLM (no. 8400063) that contain cost comparisons of the alternative disposal sites. In sum, the DEIS must be rewritten to include the required economic data and comparisons.

18

All in all, the DEIS is so remarkably deficient and biased that I feel compelled to demand that the entire EIS be rescoped and redrafted. Simple editing will not make the current document into a legally defensible, and environmentally acceptable, analysis. The bias betrayed towards granting RBOSC whatever they wish in the way of land parcels is so apparent that I ask that no company personnel be involved in any further preparation of this EIS.

Sincerely,

Connie Albrecht

Connie Albrecht
Colorado Representative

19

United States Department of Agriculture
Forest Service
Rocky Mountain Region
11177 W. 8th Avenue
Box 25127
Lakewood, CO 80225

Reply to: 2120

Date: DEC 9 1985

Butch Smith
Bureau of Land Management
White River Resource Area
P.O. Box 928
Meeker, Colorado 81641

Dear Mr. Smith:

We have reviewed the Draft EIS for the Federal Prototype Oil Shale Lease Tract C-a and have the following comments on the air quality impacts analysis.

The section on Atmospheric Deposition, page 190, states that the Forest Service has set a threshold criteria of 5 kg/ha-yr of sulfur deposition. This is not correct. The Forest Service does not have sufficient information at this time to set a threshold criteria for sulfur deposition for high elevation ecosystems. The 5 kg/ha-yr threshold level has been proposed by some groups as an amount of sulfur deposition which may result in damage to sensitive ecosystems. However, the objective in wilderness management is to protect against man-caused change rather than damage. 22

We agree with the statement in the Draft that it is not possible at this time to determine the significance of the predicted nitrogen deposition rate of 3.99 kg/ha-yr at Ned Wilson Lake. Our concern with oligotrophic lakes like Ned Wilson is that nitrogen added to the aquatic ecosystem may stimulate additional algae growth during the ice free months. When the algae die during winter, drop to the top of the sediments, and decompose aerobically, significant disolved oxygen problems may result. This could be especially significant for lakes such as Ned Wilson which are only 16 feet deep but receive 7-9 feet of ice cover during the winter.

The Forest Service, in conjunction with EPA and USGS, is currently involved in a research project to determine acceptable levels of sulfur and nitrogen deposition for the Flat Tops Wilderness. BLM and Rio Blanco Oil Shale Company may wish to participate in this type of research. Such participation would help determine the impacts associated with the Tract C-a lease.

We appreciate the opportunity to comment on this Draft EIS.

Sincerely,

S Hanks
for JAMES F. TORRENCE
Regional Forester

20

U.S. Department
of Transportation
**Federal Highway
Administration**

Memorandum

Subject: Draft Environmental Impact Statement (EIS) for the Proposed Offtract Lease for the Federal Prototype Oil Shale Lease Tract C-a

Date: December 5, 1985

From: Leon J. Witman
Division Administrator

Reply to Attn. of: HPD-CO
059

To: Mr. Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P. O. Box 928
Meeker, Colorado 81641

38 We have reviewed the Draft Environmental Impact Statement (EIS) for the proposed offtrack lease for the Federal Prototype Oil Shale Lease Tract C-a. This statement adequately identifies highway impacts.

Project Development Engineer

21

March 3, 1849

IN REPLY REFER TO:

United States Department of the Interior
FISH AND WILDLIFE SERVICE
COLORADO FIELD OFFICE
730 SIMMS STREET
ROOM 292
GOLDEN, COLORADO 80401

December 9, 1985

MEMORANDUM

To: Project Coordinator, BLM,
Meeker, Colorado

From: ACTING Assistant Field Supervisor, ES
Lakewood Suboffice, Golden, CO

Subject: Review and Comments - Draft Environmental Impact Statement (DEIS) Offtract Lease for Federal Prototype Oil Shale Lease - Tract C-a

We have reviewed the subject document for content and consideration of the affected fish and wildlife resources and wish to provide the following comments for your consideration in development on the FEIS.

General Comments

Overall we find the DEIS to be concise, well written and readily understandable in-so-far as what is included in the analysis. We are, however, extremely concerned about the scope of the DEIS with regard to two major items:

I. As stated on page 1 of the DEIS, "This EIS does not address the complete disposal needs of a totally open pit mined tract, but only addresses the legally mandated limitations of a 6,400 acre offtract lease".

Comment: As such, this DEIS analyses impacts of a preferred alternative which would facilitate development of the C-a tract to a development level of only 26 to 34% of its full potential. Any decision for "partial" development of this degree must only be considered a forerunner of subsequent decisions involving additional development and additional environmental impacts. 13

Furthermore, CEQ in "Questions and answers about the NEPA Regulations (1981)" states: "A potential conflict with local or Federal law does not necessarily render an alternative unreasonable, although such conflicts must be considered.

Alternatives that are outside the scope of what Congress has approved or funded must still be evaluated in the EIS if they are reasonable, because the EIS may serve as the basis for modifying the Congressional approval or funding in light of NEPA's goals and policies. Section 15DD.1 (a)".

During scoping meetings the FWS and other agencies suggested that one alternative should evaluate the impacts of offsite disposal under the full development potential of the C-a tract. We are again suggesting that full disclosures of environmental impacts may and should require such analysis in the FEIS. 13, 15

II. The FEIS should address all environmental impacts known to resulting from a decision to lease disposal sites. A major omission here are the impacts from needed water diversion and reservoir structures. Although the DEIS recognizes potential for these impacts and anticipates their inclusion in a DOP, the significance of these environmental consequences including potential effects on threatened and endangered species should be included in the FEIS as well as the biological assessment. 36, 37

Although one could contend that these facilities have been included in other documents, they have not been evaluated in sufficient detail to provide any conclusive analysis as to the anticipated impacts on fish, wildlife, or threatened and endangered species.

We recommend that such an analysis be included in both the biological assessment and the FEIS. As the DEIS indicates that specific locations and design of these facilities is somewhat dependent upon selection of alternatives, several analysis scenarios may be required.

Specific Comments

Page 36, 1st column, last sentence: The lake under discussion here needs to be included in the revegetation and impact section of the text. 38

Page 49, Area common to Offtract Alternatives - 2nd sentence: Considering the use as "Temporary for the life of the project" is very misleading. It is our understanding that this area would be used for 56 years (pg. 25) with this disposal site alone which will only account for recovery of the first 26-34% of the reserves on the tract.

Page 64, Mitigation Requirements - Wildlife. We are pleased to see that the development of a wildlife mitigation plan is a requirement however, the development of a plan, in and of itself will not ensure any mitigation of adverse wildlife impacts. To be effective, such a plan needs to be guided by established levels of attainment, be approved by the wildlife agencies, and have the implementation of such a plan ensured by lease stipulation. 39, 82

Page 69, Table II-6 - States: ". . . water requirments for retorting may indirectly impact T/E Colorado River fishes". 37

Comment: As discussed under our General Comment section, the effects of this water use needs further analysis for T/E and other environmental effects in both the FEIS, and as they relate to T/E species; the biological assessment.

Page 109, Column 2 paragraph 2; Since the potential for raptor impacts appears high and systematic raptor surveys have not been conducted on the areas, the FWS strongly recommends that such surveys be conducted and results included in the FEIS. At minimum, lease stipulations should be developed to ensure such surveys are conducted and mitigation measures developed to require mitigation if conflicts become evident. 40

Page 112, Paragraph 3: See General Comments and Comment on page 69. 37

Page 119, Last sentence, Historically, wildlife rather than livestock grazing was the principal use of these lands. As such we frequently guide reclamation goals, we recommend that the text be changed to more accurately reflect this use. 41

Page 144, 2nd paragraph. $6.62/day for non-resident hunters appears to be a serious underestimate of this recreation value. We suggest that the source for this figure be reestablished and included or that the DDW be consulted for a more appropriate figure. 2

Page 199, Last 3 sentences. It should be noted that EIS alternatives should not be governed by leasing constraints. Please refer to our General Comments and CEQ regulations. 15

Page 206-223, Hydrology. The water quantity discussions should include surface water requirements essential for shale retorting and processing facilities. Additionally, the biological assessment should address the concerns for water quality which surface in these discussions. 36

Page 225, 2 column, paragraph 4, - States: "As partial compensation for removal of mule deer habitat, mitigation efforts may be undertaken to create habitat suitable as severe winter range". 42

Comment: When will the "may be" be replaced with "will be" or "shall be"? We believe that this type of mitigation need is what was intended and is required as "terms and conditions" under Section 505 of the Federal Land Policy and Management Act of 1976. Further, the true impact of the action cannot be assessed until the likelihood of mitigation measures are known. 42

Page 227, Paragraph 4. Additionally, the potential exists for raptor electrocution from project related powerlines. We suggest that a mitigation stipulation be provided to reduce the potential for such events through construction design. 43, 82

Page 227, Threatened and Endangered Wildlife - Paragraph 2. If depletions on the White River or Colorado River Sytstem are identified they will be considered as direct impacts for the purposes of Section 7. Conclusions on threatened and endangered species of this nature are premature pending the conclusion of Section 7 Consultation. 22

Page 232, Column 2, Sentence 3. Attributing the loss of 5120 acres of habitat to the No Action Alternative appears to be very misleading. Would not these same acres be lost with the other alternatives? Therefore, instead of a difference between the proposed action and the no action alternative of 1248 acres as inferred, the actual difference is 6368 acres. If this is true, the text should be modified to show either cumulative losses or a true comparison of the impacts. 2, 22

Page 234, Paragraph 5. If the vegetative structure and composition for the revegetation of the storage pile is already established the potential for wildlife mitigation on this area is severely curtailed. Furthermore, the effectiveness of the Wildlife Mitigation Plan (the only currently committed wildlife mitigation) becomes suspect. 22

Page 238, Column 1, last paragraph. This proposed plan to replace grazing losses is to occur on the same lands proposed to replace lost wildlife habitats. Although vegetation improvements for livestock or wildlife frequently benefit the other, the maximazation for mitigation of one over the other seldom maximizes conditions for both. A choice must be made on whether wildlife mitigation or increased grazing will take precedence and this decision should be clearly stated. 44

Page 243, Sentence 1. States: "Wild horses would lose some important habitat features during the short term".

Comment: Can the reader assume that "short term" refers to the 56 year life of the project? 81

Page 243-244 Here again, the acreage figures appear to be misleading. It would seem that the no action alternative affects 180 more acres than the Proposed Action Alternative. These figures should be presented to provide the decision makers a clear comparison of alternatives. For example, if the impact of the Proposed Action on PJ is 1630 acres plus that lost under the No Action, (1810 acres), it should indicate so or else show 3440 acres lost. 2

Summary

We believe the OEIS has potential to be a valuable and accurate assessment of the impacts to be anticipated from off-site disposal leasing for tract C-a. We do however, have some rather serious concerns regarding the scope of the proposals, extent of committed mitigation and full disclosure of the water use analysis associated with this project.

We appreciate the opportunity to review and comment on the DEIS and hope that these comments are of value in the preparation of the Final. If you should desire any clarification on these comments, please call Ronel Finley at (303) 236-2675.

L. Ronel Finley

cc: CDOW, Grand Junction; Oenver
FWS/HR, Oenver; Salt Lake City; Grand Junction

22

STATE OF COLORADO RICHARD D. LAMM, Governor
DEPARTMENT OF NATURAL RESOURCES
DAVID H. GETCHES, Executive Director
1313 Sherman St., Room 718, Denver, Colorado 80203 866-3311

Geological Survey
Board of Land Commissioners
Mined Land Reclamation
Division of Mines
Oil and Gas Conservation Commission
Division of Parks & Outdoor Recreation
Soil Conservation Board
Water Conservation Board
Division of Water Resources
Division of Wildlife

December 16, 1985

Mr. Butch Smith
Bureau of Land Management
P. O. Box 928
Meeker, Colorado 81641

Dear Mr. Smith:

State agencies have reviewed the Draft Environmental Impact Statement (DEIS) on the Federal Prototype Oil Shale Tract C-a Off-tract Lease. Extensive cooperation between the Bureau of Land Management and several state agencies has provided ample opportunity to identify and discuss issues related to the proposed lease. For the most part, the DEIS is responsive to these issues.

Our primary concern continues to be the limited scope of the off-tract lease decision. The EIS analysis properly focuses on the 50-year active life of the disposal site but the document makes clear that a single 6,400 acre off-tract lease will not accommodate the waste associated with full development of the Prototype Oil Shale Lease. The implications of this fact, however, are not adequately discussed. 13

We recommend that additional information be presented and that the DEIS discuss the implications of an off-tract lease which accommodates only one-third of total waste disposal needs. For example, a major impact of the decision to lease any of the alternative tracts will be a large open pit on the C-a lease. Very little is said about the nature and effects of this pit or about its temporary or permanent reclamation. While the EIS does not state that additional off-tract leases will be immediately available for waste disposal, the meager discussion of the pit suggests that such an assumption is implicit in the analysis. 7, 13, 38

We realize that much additional detailed information will be available in the Detailed Development Plan and the application for a Mining and Reclamation Permit. The Environmental Impact Statement, however, should identify and assess significant impacts associated with various foreseeable configurations of the pit at the end of the 50-year time frame. Reclamation options and potential beneficial uses of the open pit mine should be discussed in a general way. 45

Other comments on the DEIS pertain to air quality, water and regulatory authorities. The Division of Wildlife has reviewed the document and finds the impact analysis and mitigation to be adequate. The Division desires to maintain its close working relationship with BLM on this project.

22

Regarding water issues, the DEIS evaluates several off-tract sites for use as a disposal site for the spent shale from an open pit oil shale mine. Ground water from the pit is to be used in the mining process. The DEIS correctly states that the operators must augment and mitigate valid surface and subsurface water rights under State Law.

The Philadelphia Creek and West Fork of Spring Creek alternatives would involve the construction of detention dams and reservoirs. These reservoirs may fall under C.R.S. 37-87-105 and C.R.S. 37-87-125 and, if so, the plans and specifications must be submitted to the State Engineer for review. 46

The preferred alternative involves the construction of catchment and diversion dams on several unnamed streams to divert the water around the proposed shale pile. How would this affect any existing water rights in the vicinity? The EIS should also identify all senior water rights in the vicinity that may be impacted by each alternative. Unless the water rights are identified it is hard to determine whether mitigation is possible or feasible. 47

Air quality concerns relate primarily to use of the TAPAS model. This model may underestimate impacts especially in areas of steep terrain such as Colorado National Monument and the Flattops Wilderness Area. The Air Pollution Control Division will be happy to discuss this further and work with BLM on obtaining a better assessment of impacts at Class I and Category 1 areas. 27

On page 197, reference is made to the Surface Mining Control and Reclamation Act. Because the Act deals only with coal, the reference is inappropriate. The Federal Detailed Development Plan and the State's Mining and Reclamation Permit will govern the nature of reclamation work at all disturbed areas. These approvals will need to be obtained prior to the start of project construction and will require plans for permanently reclaiming the affected sites, including the open pit. 22

Thank you for the opportunity to review this Draft Environmental Impact Statement. We also appreciate the earlier cooperation between the Bureau and State agencies and feel that the document has consequently been strengthened. Please contact Laurie Mathews or Steve Norris at my office if you would like to discuss any of these comments.

Sincerely,

David H. Getches

DAVID H. GETCHES
Executive Director

DHG:car:8417A

23

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
ALBUQUERQUE AREA OFFICE
P. O. BOX 8327
ALBUQUERQUE, NEW MEXICO 87198.

IN REPLY REFER TO:
305-Environmental
Quality

DEC 19 1985

Memorandum

To: Bureau of Land Management, Colorado
Attention: Project Coordinator

From: Assistant Area Director (Trust)

Subject: Review of Draft Environmental Statement for the Proposed Offtract Lease for the Federal Prototype Oil Shale Tract C-a

As requested, we have reviewed the above noted Draft Environmental Impact Statement. We note that neither the proposed action nor any of the alternatives presented would appear to directly impact any Indian lands or resources under the jurisdiction of the Albuquerque Area Office.

The document appears well written and to assess an adequate range of alternatives. We appreciate the opportunity to review the document.

If you have any questions, please contact Mr. William C. Allan, Area Environmental Protection Specialist, at (505) 766-3374.

Actng Assistant Area Director (Trust)

24

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
ONE DENVER PLACE — 999 18TH STREET — SUITE 1300
DENVER, COLORADO 80202-2413

DEC 26 1985

Ref: 8PM-EA

Butch Smith, Project Coordinator
Bureau of Land Management
White River Resource Area
P.O. Box 928
Meeker, Colorado 81641

Dear Mr. Smith:

The Environmental Protection Agency has reviewed the Draft Environmental Impact Statement for the Proposed Offtract Lease for the Federal Prototype Oil Shale Lease Tract C-a and offers the following comments for your consideration. Under the authority of the National Environmental Policy Act, the Clean Water Act, the Resource Conservation and Recovery Act, and the Clean Air Act, EPA is responsible for the review of EIS issues related to EPA authority or expertise. Therefore, please find enclosed detailed comments on the draft environmental impact statement.

The Environmental Protection Agency has serious concerns with the proposed action. These concerns include the potential to cause ground water degradation under the proposed lease area, the need to mitigate and control the leachate anticipated from the spent shale, the need to better estimate the ability to return spent shale and waste overburden to the open pit in order to reduce leachate volumes. In addition the EIS fails to consider alternatives that could reduce environmental impacts such as phasing the development or presenting alternatives to the "common area". Finally, the EIS fails to make use of all relevent and available information which could aid the analysis of these problems.

The EIS considered the alternative disposal sites to have a greater potential for ground water contamination than the proposed site at 84 Mesa. It would appear that the 84 Mesa site is more likely to result in ground water contamination since the aquifer is considerably closer to the surface. Experience at existing mines in the Piceance Basin demonstrates that the rate of ground water flow is several times more rapid than lab data indicate, probably due to secondary permeabilties. Thus the estimates of long periods before leachates would migrate from 84 Mesa to the aquifer are likely to be invalid based upon field experiences at similar sites. Further, this aquifer is of better quality than the aquifer at the alternative sites and therefore has more value as a future resource. 49

The estimates in the EIS on the amount of spent shale and overburden material that could be returned to the open pit appear to be too low based upon information available to EPA. Studies performed for EPA (and referenced in the attached detailed comments) indicate that from 40 to 80 percent of this material could be returned to the open pit rather than 14 percent as indicated in the EIS. 50 If additional material could be returned to the pit, the amount of land needed for disposal and the amount of spent shale leachate could be reduced. Also, the EIS does not adequately analyze the advantages associated with the alternative valley fill sites which could be designed to intercept the resultant leachate more readily than the diverse drainages adjacent to the proposed mesa site. 52

This EIS does not consistently apply similar environmental analysis criteria for each alternative under consideration. For instance, the alternative disposal sites are considered to have difficulties in subsequent resource recovery, although the same can be said of the proposed site at 84 Mesa. The information presented in the EIS for the use of 84 Mesa as a site exclusively used for spent shale disposal is inadequate given the alternative uses of that area for oilshale, oil, gas, nahcolite, sodium mineral, or ground water development, as well as grazing and wildlife habitat. Commitment of 84 Mesa to the proposed use fails to consider these and other possible future alternative uses of these federal lands. 9, 12

The EIS fails to present any alternatives to the use of the 1363-acre "common area" adjacent to tract C-a which is presented as essential to all alternatives under consideration. 25 This land is to be used for retorting and shale oil upgrading yet the impacts of these activities are not addressed in the EIS. BLM does state that the environmental impacts of these activities would be addressed in a future document such as a supplemental EIS, but this analysis would not be presented until after the 84 Mesa area is leased. This document will be supplemented with a Detailed Development Plan (DDP) under the prototype leasing provisions before mining would commence. However, it is not clear whether new analyses of alternative retorting technology, waste disposal plans, or offsite disposal options would be addressed in this document. Previous DDP documents have been limited to direct on-site activities and have not addressed alternative means to control waste streams. A complete analysis of alternatves would not be presented to decision makers unless the DDP addressed these concerns closer to the time of development. 7, 51

One alternative that we believe should have been considered is a phased development approach whereby an offtract lease is offered to the applicant as a future disposal site, but not made available to the applicant until the initial development of the open pit mine on the C-a tract has been undertaken. This option could provide the applicant the opportunity to develop initial oil production in order to demonstrate an actual need before an irritrievable commitment is made of the government's resources. 6, 29, 55,

Inadequate information was presented regarding retorting technology, waste stream volumes and composition, waste disposal plans and designs, and the possible additional volumes of spent shale that could be placed in the open pit as previously noted. The EIS does not adequately assess the implications of "no action" apparently because it assumes that without offsite disposal, tract C-a will not be developed. 7, 51 The attached detailed comments list other areas where lack of analysis based upon available information weakens the value of the EIS.

Many of the issues noted here have been prevously discussed with BLM. EPA comments on the C-a DDP plan for the Modified In-situ proposal noted our concerns with need for analysis of off-site impacts and EPA's work with the applicant, USGS and BLM on the abandonment of the in-situ retorts on Tract C-a resulted in the information that higher than predicted rates of ground water flow will ocurr. EPA's comments during scoping on the need to address the direct impacts of the facility in addition to impacts of spent shale disposal have also been previously communicated to BLM. Since the proposed development is not planned for immediate or near-term construction and a more consistent analysis of alternatives would be appropriate before a decision is rendered by BLM, EPA recommends that BLM consider the preparation of a revised draft EIS that addresses these concerns. As BLM indicates in the EIS, the preparation of a supplemental EIS may be warrented in any case if the retorting technology or other significant aspects of the proposed project change. A DDP would be acceptable as a substitute for the supplemental EIS, if it adequately and objectively address the alternatives. 82

According to the procedures EPA has adopted to rate the adequacy for draft EIS's, this EIS will be rated and listed in the Federal Register as category EO-3. This means that the Environmental Protection Agency considers the proposed action to be environmentally objectionable based upon the potential to contaminate ground water under 84 Mesa and other environmental concerns. EPA also suggests that a revised draft EIS is needed considering other alternatives such as phased development. A revised EIS should use consistent analyses of available additional data to make the document adequate to explain the consequences of the various althernatives. Please contact Mr. Weston Wilson of my staff at FTS 564-1703 or 303/293-1703, if we can provide further information on our concerns.

Sincerely yours,

John G. Welles
Regional Administrator

Enclosure

cc: Dave Shelton, Colorado Mined Land Reclamation Board

EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

FEDERAL PROTOTYPE OIL SHALE TRACT C-A OFFTRACT LEASE

Summary

p. 1. Retorting and upgrading plants and associated activities will be constructed and operated on the proposed 84 Mesa lease. Yet this EIS excludes consideration of environmental impacts to 84 Mesa and the surrounding area from such activities and attempts to assess only disposal of waste materials. BLM indicates that the environmental impacts of these other activities will be covered in a subsequent Detailed Development Plan (DDP) when a leasing decision is finalized. However, previous DDP documents have analyzed only the direct consequences of mining and retorting activities within the lease area and do not normally analyze available control technology alternatives or offsite alternatives. It is recommended that the Bureau of Land Management commit to preparing a DDP for this action that consistently evaluates the direct and indirect impacts of all proposed and alternative related activities or alternatively revise this EIS to do so. 51

p. 2. Siting the disposal area in a flat upland location does not necessarily increase the ability to control runoff or leachates. Use of the best available control technology (BACT) such as drains, liners, caps, and compaction would provide the ability to control runoff and/or leachates to minimize impacts. 54

p. 2. The EIS states that "by issuing an offtract lease to the Rio Blanco Oil Shale Company (RBOSC) for disposal on 84 Mesa, oil shale development could be stimulated." The RBOSC indicates that development of the resource is not currently planned. What basis is there for concluding that this action will stimulate resource recovery? Is the estimate of reduced costs of $1.50 per barrel sufficient to justify this claim? If so, how is this amount offset by opportunities foregone by the proposed action? 55

Chapter I

p. 7. The EIS indicates that 3.6 billion cubic yards of overburden and processed shale would be placed on the offtract (84 Mesa) area and that only 200 million cubic yards could be placed back in the open pit on tract C-a. This indicates that 5.5% of the overburden and spent shale could be returned to the open pit. According to analyses developed for EPA, an open pit operation of the scale proposed by the applicant, about 200 million cu.yd. of disposal is needed offsite. (See EPA 600/0-82-283, November, 1982). Another EPA report, indicates that at least 40% of the overburden and spent shale could be returned to the pit. (See EPA 600/8-83-005.) The estimates provided in this EIS for the requirements for spent shale and waste overburden disposal beyond an open pit are many times that indicated in studies conducted for EPA. Therefore, BLM should review the above references and revise the analysis on the amount of materials that could be economically returned to the open pit. 50

Chapter II

p. 9. The past record on inclusion of environmental concerns, impacts and alternatives in DDP documents is weak. The indication given in the EIS is that a more detailed and specific environmental analysis will be included in a subsequent DDP cannot be verified on the basis of previous DDP's. Unless the Bureau of Land Management commits to producing a DDP that will evaluate the environmental consequences on the proposed action in contrast to previous DDP's submitted, EPA is doubtful that the DDP will be adequate to present the environmental consequences of the proposed action. 51

p. 30. The EIS states that the open pit will be allowed to flood upon completion of the proposed mining activity. It is claimed that the water quality would most closely resemble that of the upper aquifer. It was also stated that approximately equal quantities of water from the upper and lower aquifers would discharge into the pit. The resultant water quality would be representative of the two aquifers which would make the salinity of the mixture higher than the upper aquifer. In addition the overburden material could contribute additional constituents to the open pit upon leaching. BLM should revise this analysis accordingly and determine if the resultant water quality in the open pit has any significant environmental effect. 56

p. 30. The report indicates that the pumpage required to dewater the proposed open pit will be 2,900 gpm from the upper aquifer and 3,000 gpm from the lower aquifer. These estimates do not reflect the information collected over the last few years in dewatering the in-situ retort on Tract C-a. As part of this effort, over 3,200 gpm was pumped from the upper aquifer which was inadequate to dewater the retort. Some discussion should be presented in the EIS concerning the potential for higher than planned pumping. New estimates of maximum dewatering should be developed using data collected between 1981 and 1984. The impacts section should be expanded to give a better discussion of the impacts on surface and ground water which might be caused by higher rates of mine pumpage. This should include an analysis of the impacts caused by the down gradient recharge from pumped mine water. The section on ground water quality does not presently address the potential for an increase in TDS in the alluvium and the upper aquifer as a result of recharging water pumped from the mine in the areas down gradient of the mine. The method of recharge could result in the leaching of soluble salts contained in the unsaturated zone. 57

p. 32. The EIS states that if the RBOSC decides to use different technology than that proposed, and the environmental impacts are significantly different, then additional environmental analyses would be required. What additional environmental analysis would be required to make this determination? BLM should commit to a supplemental EIS, if the process technology or other significant aspects of this project change. 51

p. 32. The discussion of upgrading activities should mention the need for a Premanufacturing Notice (PMN) under the requirements of the Toxics Substances Control Act as administered by EPA. 59

p. 36. As stated above, it should not be necessary to dispose of 3.6 billion cu. yd. of overburden and spent shale on 84 Mesa. The EIS should include evaluation of the alternative of returning most of these materials back to the open pit. 50

p. 36. What is the flouride and other trace element content of the retorted shale cooling water? Will trace elements or organics be volatilized in the cooling process? 60

p. 36. It should not be necessary to disposit of 3.6 billion cu. yd. of overburden and retorted shale on 84 Mesa. The EIS should include evaluation of the alternative of returning most of the overburden and/or retorted shale to the mine cut. 50

p. 36. The EIS states that compacted spent shale will be used as both a cover and liner for the disposal site. What lift thickness will be used? Will the rest of the spent shale be mixed with the overburden or layered separately? What will be the premeability of the liner, cover, and bulk of the pile? 61 How will the leachate be collected and drained from the spent shale pile or will it be collected to prevent groundwater contamination? 62

The discussion throughout the EIS gives the strong impression that a long time will elapse before any significant leachate would emerge from the pile. Some flow from the initial pile placement could likely begin early during pile construction since there is a thin shale layer available to receive snowmelt and rain. Also, the initial water added to the spent shale could drain to form additional leachate. The timing of the leachate movement is not limited to a downward movement of a wetted front that begins only upon pile completion as indicated in the EIS. 63

p. 41. The spent shale liner is not shown in Figure 11-16 as it was described on page 36. 58

p. 42. The EIS states that leachate is not likely to migrate to the ponds. What volume of leachate will be produced, of what quality, and how will it be controlled? 64

p. 43. The EIS indicates that a possible remedial measure for saturated slope instability is the construction of drains. Such drains cannot be easily nor economically installed after pile construction. 65

p. 43. The permeability calculations do not account for the commingling of spent shale and overburden nor represent the actual conditions proposed. This should be noted in the EIS. 66

p. 47. The leachate migrating from the bottom of the pile could be captured in drains instead of being allowed to flow into the groundwater. This should be included in the pile design. 67

p. 47. No effort has been made to assess the potential impacts from moisture movement in the vadose zone as a vapor within the disposal pile. 68

p. 51. The section on Environmental Impacts indicates that ground water at the Spring Creek site and the Philadelphia Creek site will be impacted more by leachate generation then ground water at the 84 Mesa site. This conclusion is not adequately supported by information in the document. The travel time for contaminants to show up at the alternative sites will be greater than at 84 Mesa due to a greater pile thickness and a greater thickness of unsaturated material underneath the site. Additionally, it should be easier to control leachate generation and localized spring flow by placing gravel blanket drains under the valley fill locations than it will be at the 84 Mesa site. 49

p. 51. How will surface or aluvial drainage be controlled in the final pile design so as to prevent movement into the disposal pile if located in the Philadelphia Creek alternative? The same comment applies to the West Fork or Spring Creek alternatives. 69

p. 54. It is not explained why only 14% of the overburden and spent shale could be placed back in the mine cut for the open pit option of the no action alternative. 53

p. 56. The "open pit/underground option" increases overall resource recovery but does not require offsite disposal. However, the description of this option is too brief to provide adequate information. How would the spent shale be disposed in the pit? What measures would be included to protect groundwater from spent shale leachate? Would 1,329 million cu. yd. of processed shale be disposed of in the pit or only 133 million cu. yd? (Both numbers are presented.) Could the plant site also be mined by underground methods to increase resource recovery? These alternatives do not require off-site disposal and recover more of the oil shale resource from the C-a tract than the preferred alternate. 70

p. 61. It is not clear why other sites east, south, and north of tract C-a are rejected as disposal sites. 15
These sites and 84 Mesa contain significant oil shale resources yet 84 Mesa is considered the only site acceptable. 71

p. 65. The explanation of the selection of preferred alternative is inadequate, since the EIS fails to compare the advantages of development contained within the tract C-a boundary. 12
The options for an open pit combined with underground mining or underground mining only offer greater resource recovery on tract C-a and do not involve loss of recoverable resources or environmental impact offtract. By not providing adequate analysis of these "ontract" options, the EIS has little value as a decision making document. 19

p. 66. The statement that only 2% of the oil shale resource below 84 Mesa would be lost to recovery by underground mining or zero lost to recovery by surface mining if 3.6 billion cu. yd. of overburden and spent shale are dumped on this site is not well founded. It will not be economically justified to move 3.6 billion cu. yd. of waste in order to begin an open pit mine. Further, the additional cost and difficulty of operating an underground mine through this waste will likely preclude development by this method. The shale and other solid mineral resources below 84 Mesa would be irretrievably lost to future recovery and the EIS should clearly so state. 5, 12, 19, 20, 30

p. 68. 71. Table II-6 provides a summary of the environmental consequences of the alternatives. This table does not accurately restate information from other parts of the EIS. Disposal of 3.6 billion tons of waste on 84 Mesa would preclude recovery of all solid minerals on this site except by "in-situ" recovery methods. 5
The "No-Action-underground" options would allow recovery of 34 to 36% of the shale resource from the C-a tract not the 27% to 33% stated (see page 56.) 2

p. 183. Is the data presented for the Union Unishale B process or for the Unishale C process? The data released by both Union and Chevron for trace element emissions have been subsuquently revised. Recent tests sponsored by EPA (unpublished to date) indicate that trace element emissions may be higher for mercury, cadmium, and arsenic than indicated by the RBOSC pilot plant results as reported in Table IV-2. The EIS should report similar data for Union and Chevron for SO_x, NO_x, CO, and NMHC (non-methane hydrocarbons). (TSP data for these other developments would not be useful since they employ underground rather than surface mining.) What would be the impact if emissions were substantially higher than the RBOSC pilot plant results? This discussion should reflect some uncertainties since the confidence limits on such data are poor. 72

p. 188-190. Consumption of 20% of the 24 hour PSD Class I increment for SO_x at Flat Tops and 16% at Mount Zirkel is "significant" as it will be cummulative with impacts from other projects and, in part, limits the extent of other oil shale developments. 73

p. 191. The analysis of the impact on surface water quality indicates that the alternative sites would have greater impact than the 84 Mesa site because there is less stream water to dilute the runoff from the site. The reaches of Yellow Creek and Douglas Creek adjacent to 84 Mesa have become perennial following the recent wet years. The information obtained near tract C-a over the last 3 years should be factored into this EIS to provide a qualitative comparison between impacts during a dry cycle versus those during a wet cycle. 74

p. 193. The advantages and disadvantages of selecting the "No Action Alternative" in terms of air quality impacts have not been assessed. The "No Action Alternative" includes options for part or all of the mining to be by underground methods rather than open pit. TSP emissions from underground mining are lower than open pit mining. Hence, statements like "emissions are generally linear with production rate" and "total emissions on tract C-a alone would probably increase" illustrate the inadequate attention given to the "No Action Alternative" in this EIS. 75

p. 198-199. In the earlier sections the EIS makes a strong case for offtract disposal of overburden and processed shale as necessary to encourage development of the oil shale resources on the C-a tract in support of the nation's energy needs. Without offtract disposal the EIS implies that development might not occur, (see page 65) where it states that "development of energy technologies may be hindered" but then goes on to state that dumping 3.6 billion cu. yd. on top of 84 Mesa in a pile averaging 560 feet thick would not result in the loss of 5.6 billion 5, 12, 76 barrels of shale oil but only 2% of this amount. If development of the C-a tract is questionable with no offsite waste piled upon it, then how can development of 84 Mesa be viable when 3.6 billion cu. yd. of wastes are placed on top of it? If it is feasible for some future oil shale operation to remove the 3.6 billion cu. yd. from 84 Mesa in order to begin to develop this site, then it may be feasible for the current lease holder of tract C-a to use some of the revenue produced from 50 years of production to move the waste back to the C-a tract for disposal in the open pit. 20, 76

p. 203. Why, under the No Action Alternative, would future recovery of remaining resources on C-a tract be forgone? Would not the same methods proposed in this EIS for recovery of resources from 84 Mesa, with 3.6 billion cu. yd. of waste on it, be equally or even more applicable to future recovery from C-a tract which would have a much smaller volume of waste on it? 20, 21

p. 204. The figures reported for irreversible and irretrievable commitment of resources for each alternative misrepresent what could reasonably occur and were not produced by consistent application of the same assumptions regarding mineral recovery for all alternatives. 20, 77

p. 207. This section on impacts does not adequately address the potential failure of the pile at 84 Mesa and the resulting impact on Yellow Creek. 78

p. 209. Background water quality at the 84 Mesa site is better than that at the alternative sites, although this information does not appear to have been factored into the report. The potential uses of existing water at the alternative sites are less than those at the 84 Mesa site, thus the degradation of water at those sites would be of less consequence. Additionally, the alternative sites are located on the edge of the basin, which eliminates the potential for impacting ground water in the Green River Formation. An additional factor which has not been taken into account is the ability of leachate exiting from the valley fill piles to be captured prior to entering any surface waters. 49

p. 209. No justification is provided to support the claim that the water quality of the flooded mine pit would most closely resemble that of the upper aquifer. What about leaching of the overburden disposed in the pit? What about impact from the lower quality of waters in the lower aquifer? Could poorer water quality in the open pit affect its future use or result in lower quality waters within the upper aquifer? 56

p. 215. The EIS make reference to treatment of wastewater prior to use for spent shale moisturizing, but fails to describe such treatment, the composition of the water to be used for moisturizing, or the quantity of wastewater to be co-disposed with the spent shale. 79

p. 219. The description of groundwater quality for the no action alternative is superficial. Even less detail is provided than for the other alternatives. It would appear that all three options under this alternative could not have the same impacts upon surface and groundwater, yet no distinction is made. 22

p. 220. The EIS indicates that there are springs located within the alternative sites which may create a pile stability problem. The EIS ignores the fact that these springs appear to be localized. Their recharge area is apparently the bedrock outcrops immediately adjacent to the springs. The placement of the pile will most likely cut off recharge to the springs. 80

References

p. 355. 361. Several EPA reports are used as references but not cited as EPA reports. For example "Bates, 1983" was published in Environmental Progress (Vol. 3, No. 2) and as an EPA report - EPA 600/D-84-036 (1984). Much of the work at Colorado State University was sponsored by EPA and published by the Agency. For example, "Harbert, 1978" is EPA report 600/7-78-021 which was later updated by EPA/7-81-139 (1981). Several appropriate EPA reports were ignored such as EPA 600/D-82-283, "Overview of Environmental Impacts of Large Scale Surface Mining of Oil Shale: Piceance Basin, Colorado" and EPA 600/8-83-005, "Pollution Control Technical Manual: Lurgi Oil Shale Retorting with Open Pit Mining".

PUBLIC HEARING
OFFTRACT LEASE
FEDERAL PROTOTYPE OIL SHALE TRACE C-a
BUREAU OF LAND MANAGEMENT

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

COLORADO ROOM
HOLIDAY INN - DENVER WEST
14707 WEST COLFAX
GOLDEN, COLORADO

TUESDAY, NOVEMBER 7, 1985
7:30 p.m.

Reported By:
BEVERLEE BAUER HEDRICK
Certified Shorthand Reporter
1029 East 8th Avenue
Denver, Colorado 80218

INDEX

COMMENTS BY:	Page
BILL HILL, Assistant Area Manager White River Resource Area Office, Meeker	3, 4, 11,12
BUTCH SMITH, Environmental Document Coordinator, White River Resource Area Office, Meeker	4, 5
DEAN ALLRED, Marathon Oil Company, Littleton	6
JOHN DYNI, U.S. Geological Survey, Denver	7, 8, 9,10
BARBARA SCHMALZ, Environmental Coordinator, Col-rado State Office, Denver	11, 12

ALSO PRESENT:

GEORGE LONG, BLM
ROGER WICKSTROM, BLM
JOE FOX, BLM
JOHN MILEY, BLM
WES WILSON, EPA
C. O. HOOK, New Energy Tech.
CONNIE ULBRECHT, Friends of the Earth
VIC COLLINS

HOWARD EARNEST, Rio Blanco Oil Shale Company
F. H. EARNEST, Rio Blanco Oil Shale Company
G. C. SLAWSON, Rio Blanco Oil Shale Company
F. R. JACKSON, Rio Blanco Oil Shale Company
D. A. BOYCE, Rio Blanco Oil Shale Company
G. E. BERTOLIN

ERRATA: F.H. Earnest is a student at the Colorado School of Mines, not an employee of Rio Blanco Oil Shale Company
F.R. Jackson is an employee of the BLM, not Rio Blanco Oil Shale Company

P R O C E E D I N G S

MR. HILL: My name is Bill Hill and I am the Assistant Area Manager for the White River Resource Area Office in Meeker, Colorado.

With me here this evening with the BLM at the table are George Long -- he was the or he is the Physical Science Technical Coordinator for the EIS -- Barbara Schmalz, Environmental Coordinator for the Colorado State Office; Butch Smith, the Environmental Document Coordinator, and in the audience we have John Miley, Mining Engineer with the Oil Shale Projects Office, and Roger Wickstrom, the Environmental Documents Team Supervisor in the White River Resource Area.

We are here this evening to accept written and oral comments on the adequacy of the draft EIS for the Federal Prototype Oil Shale Tract C-a Offset Lease.

If you have written comments but do not wish to provide oral testimony you can provide those to Butch Smith. Oral comments should be accompanied by a brief written synopsis. We really don't require that this evening. However, it should be mailed at the earliest convenience.

Oral comments will be limited to 10 minutes each. If you wish to provide comment and have not done so already please sign the register at the front.

We will not respond to comments at this time. Instead we will analyze them. If they are substantial enough

to require altering the document that will be done or a reason will be given in the document as to why the document was not changed.

Prior to receiving comments this evening I would like Butch Smith to provide just a brief description of events that have taken place that led to the preparation of this document and the selection of the preferred alternative. Butch?

MR. SMITH: I will just go ahead in case there's someone in the audience that is not familiar with the project although I think I know most of you and you probably are, but just a brief summary of the background.

The Rio Blanco, which is the leaseholder of Tract C-1, is currently under a lease suspension until July of 1987 or until the Department of Interior issues an offtract lease. In Decmeber of 1982 Congress amended the Mineral Leasing Act of 1920 to allow issuance of an offtract lease to Rio Blanco Oil Shale Company if the Department of Interior determined that it was feasible and necessary.

In August of 1983 Rio Blanco submitted a proposal to lease 6,400 acres on 84 Mesa. The BLM performed an environmental assessment on this proposal and determined that there would be significant environmental impacts and that triggered the need for a full Environmental Impact Statement.

The BLM conducted scoping to determine alternatives to the proposed action on the location at 84 Mesa. Also special studies in hydrology, air quality and reclamation were initiated at that time. Then in July of 1984 the EIS process commenced.

A brief description of the proposed action: Rio Blanco proposes to lease 6,400 acres on 84 Mesa for replacement of overburdened, spent shale, top soil storage and replacement of associated facilities. On the graphics map on this side of the room the location of Tract C-a, 84 Mesa, the alternatives, and what we call the common areas demonstrated approximately 1,300 acres will be retained as what we call the common area and would go with any of the alternatives.

That would be the location of the facilities, would not be permanently with any kind of disposable materials. The alternatives are Philadelphia Creek and the West Fork of Spring Creek, and they would be accessed by large overland conveyor system.

As outlined in the document, the proposed site of 84 Mesa was also determined to be the preferred alternative by the Bureau of Land Management. A determination was made on the basis of environmental factors, safety considerations, resource management considerations, and the goals of the federal prototype oil shale program, so, Bill, that's a brief summary and I think this would be a good time to go into the

oral arguments.

MR. HILL: Thank you, Butch.

Has everyone wishing to express oral comments this evening signed the register? That being the case, we will proceed in the order that the register was signed. When I identify you, please identify yourself and the organization which you're speaking for. Our first speaker will be Dean Allred.

MR. ALLRED: Want me to come there, Bill?

MR. HILL: Go ahead right there where you're at.

MR. ALLRED: I am Dean Allred with the Marathon Oil Company and I just wish to make a statement, Bill, in behalf of our company.

Marathon will submit a very detailed written comment on your draft EIS for the lease of offset tract waste disposal related to the C-a prototype lease tract. These comments are in preparation and will be in yours and Mr. Canon Richards' office before the December 9th deadline.

It is only fair to again state that Marathon strongly disagrees with the conclusion that led to your recommendation for waste disposal on the 84 Mesa.

Marathon desires when you receive the written comment that you not only study it carefully but also that it be included in total as part of the final EIS, that is rather than being alluded to in your conclusions.

We believe our evaluation also needs to be made available to the public and to the Secretary of the Interior for consideration before a non-oil type lease is granted for subject lands. Thank you.

MR. SMITH: Mr. Allred, I think it is probably common practice that we would include your response in the final EIS.

MR. ALLRED: I just want that statement to be part of this.

I didn't think you were going to get a comment, Butch.

MR. SMITH: I was worried too.

MR. ALLRED: It will be coming.

MR. HILL: At this time I would like to ask those from the BLM that had a part in the document were there any parts of the comment that they would like to have clarified

Okay, we will proceed to the second speaker, Mr. John F. Dyni.

MR. DYNI: Dyni. I am John Dyni with the U.S. Geological Survey, Branch of Central Mining Resources.

I like Dean Allred will also submit a written comment on the geology of the site and the natural resources and mineral resources as they have been described in the EIS.

The only comments I would like to make right now is to point out a couple things. Looking at this map which

is the map of the 84 Mesa site, the Philadelphia and West Fork Spring Creek alternatives from the EIS, from what I gather from my own information there is only one core hole that I am aware of on the 84 Mesa site, Core Hole No. 2. It is the Duck Creek U.S. Bureau of Mines core hole.

Information on that core hole -- I think there is a detailed lithologic log. I am not sure at this point if there is detailed analysis other than shale oil analysis. I don't know if there is dawsonite or nahcolite analysis for that core hole.

My feeling is that -- well, another aspect of the geology is that we know that the deposits of oil shale, of nahcolite and dawsonite increase from west to east across this site. We do have evidence of nahcolite in the Duck Creek core hole and a fair amount of it. We don't know, however, over on the eastern part how much nahcolite is present.

We do know in this area (indicating) that two factors affect the distribution of nahcolite. One is we are getting out to the edge of the naucolite deposition is one factor and another factor is the groundwater in the area.

From the standpoint of dawsonite I believe that it generally becomes lower in grade and thinning from east to west in this case. Oil shale also is much richer on the eastern part of the tract and becomes thinner in the lower part on the western side.

These are all factors that I think we need to know more about, that the BLM needs to know more about, to really understand the total resources that are there in place, the grade and thickness of each, and I don't think one core hole is sufficient to do that. 9

That's my comments.

MR. HILL: Okay. At this time again I would like to ask the BLM members present if they have any questions that need to be clarified on that comment.

MR. SMITH: You feel that the description of the affected environment solid minerals was not adequate?

MR. DYNI: I do. I think that it is quite inadequate because even in one of the -- I think it is figure III -- there was a reference to a cross-section here and I think that -- let's see if I have that -- well, figure III-7 shows a lithologic log. It is labeled Multi Mineral Corporation, page 86. If you turn to that page, that log I don't believe is representative of the geology on the 84 Mesa site.

In fact that Multi Mineral Corporation prototype would suggest that that is perhaps sodium, that litholog of the permanent log up to the east. It also mentions the Upper and Lower Salts. We don't know if salt beds, halite beds are present on the 84 Mesa site so I don't think that's an adequate representation of the geology of the 84 Mesa site.

MR. SMITH: So to interpret that a little further, what you are saying is that we don't know what is there, we don't know what is potentially lost?

MR. DYNI: That's correct and I think the number towards the back of the -- well, on page 200, for example -- let's go to page 201 -- that might be a good one to look at. On page 200, Table IV-10, for example, describes the total oil shale in place in 84 Mesa as ten billion barrels. I don't think you have adequate information to make that determination at this point.

It could be quite a bit more than that. It is my suspicion that it is. I haven't done a detailed analysis on it. I think the nahcolite figure, I would like to know where it came from because I really don't feel that you have adequate information to come up with a number of nahcolite or for dawsonite.

As I mentioned before, to my knowledge right now I am not sure, but I don't think nahcolite and dawsonite were analyzed. In other words, you may not have information for hindsight on those two minerals.

MR. SMITH: John, would you like to comment on that at all or any further questions?

MR. MILEY: No.

MR. HILL: Are there any other points of clarification? Thank you. Is there anyone else in the audience that wishes to provide an oral comment at this time?

If not I wish to take this opportunity to thank you all for coming this evening. I would like to remind you that written comments will be accepted in the White River Resource Office in Meeker until December 9th. If the current schedule is held, a final document will be released to the public in April of 1985.

If there are no further comments -- yes, sir?

MR. HOOK: When would the record of decision then be issued? 48

MR. HILL: Butch, do you have the schedule available for that?

MS. SCHMALZ: The way the EIS is worked in the Department of Interior is that the State Director can sign the record of decision 30 days after the final EIS is released to the public.

The process for appeal is that you must appeal to the Interior Board of Land Appeals, the IBLA, there is no appeal for any EIS within the Bureau, and if IBLA does not accept your appeal --

MR. HOOK: That's not my question.

MS. SCHMALZ: If the IBLA doesn't accept the appeal, then it goes to court.

MR. HOOK: You expect the decision --

MS. SCHMALZ: I expect that it will be signed 30 days after.

MR. SMITH: But that is really unknown though.

MR. HILL: Any other questions?

Okay, if you have informal questions after we close the meeting and you wish to grab one of us, feel free to do so.

Thank you again for coming.

(Proceedings adjourned at 7:50 p.m.)

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STATE OF COLORADO)
) SS.
CITY AND COUNTY OF DENVER)

REPORTER'S CERTIFICATE

I, BEVERLEE BAUER HEDRICK, Certified Shorthand Reporter and Notary Public within and for the State of Colorado, do hereby certify that I reported stenographically the proceedings on November 7, 1985, in the above-entitled matter at the time and place hereinabove set forth;

That the same were taken down by me in stenotypy and thereafter reduced to typewritten form by me, and that the foregoing is a true, full and accurate transcript of my stenotype notes.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal this 20th day of November, 1985.

My commission expires: November 21, 1985.

Beverlee Bauer Hedrick
Certified Shorthand Reporter
and Notary Public
STATE OF COLORADO

1029 East 8th Avenue
Denver, Colorado 80218

February 5, 1986

Mr. John Fend
Project Coordinator
Bureau of Land Management
PO Box 928
Meeker, CO 81641

Dear Mr. Fend:

I have read portions of your Draft Environmental Impact Statement for Federal Prototype Oil Shale Tract C-a, Offtract Lease and would like to make a few comments on the Cultural Resource section. Over the past seven years I have read several E.I.S.'s and this is the first one that actually lists the sites which may be impacted by the proposed action. The document also outlines those properties which are listed on, or may be eligible to, the National Register of Historic Places and the potential effect of this proposed undertaking on them. Federal guidelines (36CFR800.4) stipulate this type of information is to be included in all Environmental Impact Statements, unfortunately this is one of the few I have seen that includes this type of specific data. The best interests of the cultural resources are served by including this type of information on this fragile, non-renewable resource. By incorporating this approach in future E.I.S.'s, professionals who are interested in the proposed action, can submit comments on the potential effects to the resource.

The effort made in the cultural resource segment of this EIS is applaudable. Future Environmental Impact Statements would better fulfill Federal Regulations if they included cultural resource sections constructed along this extensive format. This EIS, from a standpoint of a cultural resources specialist, is closer to compliance than past documents have been.

Thank you for your time.

Sincerely,

A. Dudley Gardner
PO Box 1701
Rock Springs, WY 82901

RESPONSE TO COMMENT LETTERS

The numbered responses below correspond to the bracketed numbers on the comment letters and public hearing transcripts. Following the title of each response is a list (shown in parenthesis) of the letter(s) and/or public hearing where the comments were raised. Responses may consist of a text change, a clarification of the draft environmental impact statement (DEIS), or an explanation of why a particular issue was or was not addressed. Text changes (Response No. 22) are listed by chapter and page number in the section, Changes to the Draft EIS. Editorial changes (Response No. 2) in the text of the DEIS are listed following the text corrections.

Response No. 1. FLUID MINERALS (1). The DEIS states on page 205 that "on 84 Mesa it may be possible to extract fluid minerals through wells directionally drilled from locations adjacent to the waste pile." We therefore do not think that the disposal pile on 84 Mesa (Preferred Alternative) will very negatively affect the future development of the natural gas estate as it will still be possible to develop this resource. We do recognize the additional cost of such directional drilling development; however, development would still be viable.

Response No. 2. EDITORIAL CORRECTION. Editorial corrections in the text have been made. Please see Errata section.

Response No. 3. CULTURAL RESOURCES (3). The Bureau of Land Management (BLM) will consult with the Advisory Council as required by the National Historic Preservation Act and 36 CFR 800. BLM will enter into consultation through the development of a Memorandum of Agreement; however, such consultation with the council is still premature.

Response No. 4. SOCIAL (4). The primary sociological impact would occur from the development of Tract C-a. The addition of an offtract disposal site to the operation of Tract C-a would not be a significant increment to the sociological impact. The social impacts would occur with or without an offtract lease. The need for a more substantial social investigation is not imperative, since the scope of this environmental impact statement (EIS) deals only with an offtract surface lease, not the mining of Tract C-a.

As provided by the Council on Environmental Quality (CEQ) regulations regarding the incorporation of information by reference, please note the Draft Piceance Basin RMP/EIS of April 1984 was referenced on page 141 of the EIS. That document provides an in-depth analysis of sociological impacts associated with the development of Oil Shale Tracts C-a and C-b.

Response No. 5. SOLID MINERALS (7, 11, 13, 17, 18, 24). The resources underneath 84 Mesa would not be lost forever. These resources would still be intact and technically recoverable. To move the unconsolidated waste pile would be equal to moving only a small portion of the solid rock overburden, which requires the conventional drill, blast, load, haul, crush, and hoist cycle. To dispose of the spent shale and overburden to either of the alternative disposal sites might be more of a hindrance to the development of Tract C-a by open pit mining than the disposal of these same wastes to 84 Mesa would be to the development of 84 Mesa by open pit mining. The economic unfeasibility of recovery of resources beneath a disposal pile is not a certainty. Technology exists today to underground mine 84 Mesa with a in situ disposal pile. This necessitates larger pillars left in place, hence some small increased mineral resource loss.

Response No. 6. DILIGENCE REQUIREMENTS (7, 16, 24). The surface lease for offtract disposal would be tied to and contingent upon the execution of the terms, conditions, and agreements of the prototype lease of Tract C-a (Appendix A). The offtract lease document would contain sufficient terms and conditions to ensure protection of the environment, public health and safety, indemnify the United States against liability, and protect the public interest. Once a surface lease has been issued to Rio Blanco Oil Shale Company (RBOSC), the temporary suspension allowed by the Department of the Interior in August 1982 would terminate; and the time frames of the existing prototype lease program would continue, allowing extensions for the suspension period. Once this occurs, RBOSC must develop the tract, petition for another suspension, or give up its leases. BLM cannot ignore RBOSC's intentions at this time, but BLM would proceed in good faith on RBOSC's proposals until further action occurs.

Response No. 7. SCOPE OF EIS (7, 11, 17, 22, 24). The mining of Tract C-a itself and comments addressing the need for a "Piceance Basin" wide oil shale mine plan are beyond the scope of this EIS. Long-term planning for basin development was not a factor in the preparation of the DEIS. This EIS effort analyzes the impacts of offtract disposal needs for the open pit mining of oil shale on Tract C-a. The mining of oil shale on Tract C-a has been previously addressed in the 1973 Prototype Oil Shale Leasing Program EIS and Rio Blanco Oil Shale Project Detailed Development Plans (DDPs) (1976b, 1977c, 1981b). Many of the operational aspects of Tract C-a, particularly concerning ancillary facilities, retort methodology, and pit design, can be best addressed once the DDP for a scaled up full production open pit mine on Tract C-a is submitted. The analysis of the DDP is considered a part of the ongoing environmental process and involves decision making on the part of the federal government, e.g., environmental assessments and perhaps environmental impact statements.

Response No. 8. TRANSPORTATION (9). The increased traffic flows anticipated will result from the development of Tract C-a, not offtract waste disposal. These impacts have been addressed in earlier documents—1973 EIS on Prototype Leasing and the Draft Piceance Basin Resource Management Plan EIS (1984b). The concerns noted regarding climbing changes and intersection channelizations are outside

BLM's jurisdiction, but can be included within the local county (Rio Blanco) permitting process. The prototype lease on Tract C-a provides stipulations for RBOSC to acquire all necessary county permits.

Response No. 9. SOLID MINERALS (11, 13, 17, 18, 24, 25). Estimates for the mineral resource evaluation were made using the data available. Although the information used for solid minerals in 84 Mesa may be inconclusive, it is suitable for analysis purposes. These estimates are within the limits of accuracy for the determinations made in this EIS. There are very large quantities of potentially recoverable mineral resources that would be impacted. The impact analysis did not require exact information, since the mineral resources underneath 84 Mesa are known to be substantial. The analysis set forth in the DEIS reveals that a percentage of the resource would be lost because of the proposed action. This percentage will remain relevant to whatever resource exists, whether it is more or less than estimated in this document. Some data used for the resource determinations was not presented in the document. The information presented is sufficient for issuance of a surface lease. Further information would be required upon issuance of a mineral lease. The waste disposal alternatives are not nor have they been proposed as leasable sites for mining by BLM. A more detailed analysis of the in situ resources will not be necessary until sometime before actual development of the subsurface resources.

Response No. 10. SOLID MINERALS (11). The mineral resources of 84 Mesa as described in the DEIS were estimated from the limited data available. The estimates for both nahcolite and dawsonite as indicated by Mr. Donnell (Letter 17) are closer to 100 million tons per square mile nahcolite and 80 million tons per square mile dawsonite. These estimates of the resources, nahcolite and dawsonite, will be used in the overall determinations, while the shale oil resource estimates will remain as stated in the DEIS.

Response No. 11. SOLID MINERALS (11). The resource estimate for shale oil includes all oil shale resources yielding 8 gallons per ton (gpt) or more. Those resources within the referenced R-8 Zone yielding more than 8 gpt would have been included in the resource estimates.

Response No. 12. SOLID MINERALS (11, 12, 18, 24). The conservation of resources, both mineral and environmental, are the thesis of this EIS. The analogies presented by the respondents of the overall development scenarios are incomplete. The disposal of wastes west of the bluffs would have a greater impairment to the resource (oil shale) development of Tract C-a than the waste pile on 84 Mesa would have to the potential resource (oil shale) development of 84 Mesa. Each alternative results in some quantity of mineral resources forgone, be it coal, oil shale, dawsonite, nahcolite, or natural gas. The selection of a preferred alternative is reached through the analysis of the consequences of each alternative with regard to the principles of multiple-use management, public interest, and legal mandates. Based on environmental factors, resource management considerations, and the goals of the Federal Oil Shale Leasing Program, 84 Mesa is the Preferred Alternative.

Response No. 13. WASTE DISPOSAL (11, 21, 22). A single 6,400-acre lease is not large enough to handle the 10.5 to 12 billion cubic yards of waste materials that would be generated if Tract C-a were open pit mined from boundary to boundary. The disposal sites investigated in the DEIS have disposal capacities ranging from 3.6 to 4.4 billion cubic yards, thus theoretically requiring about three tracts each of 6,400 acres in order to fully mine Tract C-a. Congress was aware of this limitation when a 6,400-acre offtract lease size was written into an amendment to the Minerals Leasing Act of 1920. Since the oil shale industry is a fledgling industry, it would have been premature for Congress to commit more than 6,400 acres for disposal use prior to the availability of data upon which to make future decisions. Because of the impacts potentially associated with waste disposal of the magnitude anticipated with Tract C-a development, extensive evaluation must be done before committing more of the public lands to this purpose. The goals of the Federal Prototype Oil Shale Leasing Program probably can be met with a single 6,400-acre offtract disposal lease. These goals are briefly stated as follows:

—To simulate development of alternative sources of energy, specifically oil shale technology, by private industry.

—To develop techniques for environmental safeguards and reclamation that could be incorporated into a mature oil shale industry.

—To permit an equitable return to all parties.

—To gain expertise in the leasing and supervision of oil shale development as the basis for future administrative actions.

These goals do not include the means for developing a fully commercialized industry, but simply to gain experience in an area with many unknowns and yet-to-be-proven technologies. The Prototype Program was set up to allow oil shale development to proceed with caution, with the opportunity for evaluation and adjustment. Through initial efforts at open pit mining in the Piceance Basin, techniques could be developed that would reduce the acreage needs for disposal of overburden and spent shale.

Response No. 14. HYDROLOGY (11, 18). The information on deep aquifer water quality is limited, but the deep aquifer water quality is probably better near 84 Mesa than at the other sites. However, a potential, but unquantified trade-off is that quicker and larger releases of leachate to surface (and alluvial systems) are anticipated at the alternative sites because of greater precipitation and lower permeability of underlying strata than that under 84 Mesa. Thus, water uses in the Douglas Creek and White River may be affected more rapidly than in the 84 Mesa site. Groundwater in the Green River Formation cannot be used as the only determinant factor; the potential effects in the Piceance Basin must be evaluated relative to other potential water quality effects at the alternative sites.

Capturing leachate before it enters surface waters is an option that may be employed during the project life. However, the long-term operation and maintenance of such facilities may not be a reliable mitigative measure.

Defining details such as drains, liners, caps, and compaction as Best Available Control Technology (BACT) for oil shale mine waste piles at this time is questionable. Designation of BACT should include evaluation of effectiveness or performance, economic feasibility, and energy utility. The long-term effectiveness of any of these "technologies" is questionable when considering the time frames over which they would need to function. The long-term maintenance of such facilities and their possible failure within several decades question the feasibility of these approaches.

The mitigation of leachates, as proposed in the DEIS, will be primarily through successful reclamation and construction of surface control structures. These approaches mitigate by minimizing the rate of infiltration into the pile. Tests conducted on Tract C-a and elsewhere have shown a good likelihood of reclamation of the waste pile. Control of runoff (minimizing infiltration and removing water from the pile surface) would utilize standard engineering approaches. These "technologies" may be more cost-effective than reliance on the use of unproven technologies such as underdrains, which could fail in the near term (relative to the life of the pile). Successful limitations of runoff and infiltration could cause an undefined but probably small diminishment of overall water yield in the area. The likelihood of instability due to saturated slope failure would be small provided surface control of runoff and infiltration were effective. Also see Response No. 49.

Response No. 15. ALTERNATIVES (11, 21, 24). Alternative sites for offtract disposal were investigated and considered, but were eliminated from a detailed analysis in the DEIS for various reasons (see page 61 of text). In regards specifically to those sites west of Tract C-a—Water Gulch, Corral Gulch, Spruce Gulch, and others—constraints surrounding the contested pre-1920 oil shale claims prohibit the leasing of these federal lands until the validity of the claims is determined and all appeals are exhausted. Although the contested claims prohibit leasing of these lands, the granting of a right-of-way across the contested claims is allowed (i.e., for conveyor transport). These constraints were identified by our Solicitor's Office well after the 1973 EIS on Prototype Oil Shale Leasing became final. In summary, those areas selected as alternative sites to the proposed site are not a representation of all potential disposal sites, but were determined to be the best of the sites investigated.

Response No. 16. MINE PLANS (11). The mining of Tract C-a has been previously addressed and will be further updated at a later date once a revised DDP is submitted for approval. However, the overburden is less in the northwest corner of Tract C-a, where oil shale could be recovered earlier for use in the pilot demonstration project. The location in the northeast corner was selected for greater resource recovery with ontract disposal. The resource of the northeast area of Tract C-a is richer and thicker. Please note, Figure II-24 is for the No Action—Open Pit/Underground Alternative, not the Preferred Alternative. Land owned by RBOSC is included in the No Action Alternative (see page 54 of DEIS).

Response No. 17. WILDLIFE (11). We agree that if BLM were to base a leasing decision solely on mule deer winter range impacts, 84 Mesa would not be the optimal choice. However, since BLM works under the concept of multiple-use management, wildlife represents an important, but only one consideration in a number of public land resource values. Particularly in the case of animals, like deer, whose populations are capable of rapid response to changing habitat conditions, preservation of short-term population stability should remain secondary to the ultimate goal of protecting long-term edaphic and hydrologic (surface and groundwater) qualities from which the elementary constituents of habitat are derived.

Response No. 18. NET ENERGY (11, 17). The reference to the net energy analysis (Figure IV-15, page 300) is partially correct. The net energy analysis in the DEIS is incomplete and has been amended for this final EIS. Please see text corrections. Figure IV-15 of the DEIS is incorrect and has been removed from the final EIS.

Response No. 19. SOLID MINERALS (12, 24). See the DEIS and Table IV-11. The 84 Mesa Alternative allows the recovery of more oil shale resource than the No Action Alternative options with the least resource forgone (only 2 percent). Both other offtract disposal sites do allow more oil shale recovery from Tract C-a. Maximizing resource recovery of Tract C-a is a function of total tract development and was not the critical factor in selecting a preferred alternative. It was a factor, but one that was weighed against environmental issues, reclamation, etc.

Response No. 20. SOLID MINERALS (12, 18, 24). The premise that 84 Mesa resources are not lost is because: 1) the disposal pile can be moved to facilitate an open pit mine traveling into 84 Mesa; and 2) if an underground mine were used to mine those resources beneath 84 Mesa, with a disposal pile in place, the necessarily larger columnar pillars to support the increased weight of the overburden would result in a 2 percent loss of recoverable resources. Via underground mining, 100 million barrels of oil shale, 5.5 million tons of nahcolite, and 4.6 million tons of dawsonite would be "lost" with a disposal pile in-place on 84 Mesa (Table IV-12). This same underground mine (84 Mesa with pile) would recover 2.4 billion barrels of oil shale, 150 million tons of nahcolite, and 120 million tons of dawsonite. The forgone resources (excluding nahcolite) on Tract C-a via underground mining would be proportionately similar to those that would be foregone if 84 Mesa were underground mined. The same methods and assumptions were used for these calculations. Table IV-11 indicates the underground option precludes the open pit mining of Tract C-a; hence, only 1.7 billion barrels of oil shale versus 5.0 billion barrels (assuming open pit and unlimited disposal) could be recovered. Table IV-12 shows only 2.5 (without pile) or 2.4 (with pile) billion barrels of oil shale would be recoverable with underground mining for 84 Mesa; yet, open pit mining of 84 Mesa could yield upwards of 5.6 billion barrels of oil shale (only the 4,000-acre pile site). Therefore, the underground mining of 84 Mesa comparatively looses as much as underground mining of Tract C-a, plus the additional approximately 2 percent loss due to the potential disposal pile placement. For either site, 100 percent recovery of the entire resource in situ is not possible, regardless of the technique used; those figures given in the DEIS in Tables IV-11 and IV-12 as 100 percent represent and are based on that amount of the total resources presently recoverable by open pit mining (i.e., for Tract C-a of the 9 billion barrels of oil shale in situ, a maximum of 5 billion barrels could be recovered with unlimited offtract disposal).

Response No. 21. WASTE DISPOSAL (12, 24). This statement is based on a misunderstanding of the analysis in Table IV-11. Under No Action, Open Pit Option, footnote number 3 states, "If a decision were later made to make available unlimited offtract disposal areas, the total recoverable resource would be 100 percent." This implies that the disposal pile on the remaining portion of Tract C-a could be moved and the rest of the resource open pit mined. This analysis is consistent with the assumptions made for 84 Mesa.

Response No. 22. TEXT CHANGE. The text has been changed accordingly.

Response No. 23. COMPETING INTERESTS (13). The submittal of a proposal to exchange lands with the government neither segregates the selected lands, nor conveys, nor grants the proponent any legal right, privilege, or claim in and to the selected public lands. Furthermore, any exchange interests Marathon Oil Company (Marathon) might possibly have claimed in these public lands, because of private inholdings on adjoining mining claim interests, are considered unjustifiable, since by receipt of Marathon's motion, dated March 7, 1985, the exchange proposal of June 25, 1984, was in effect suspended.

Moreover, Marathon's objections to the Tract C-a Offtract Lease DEIS tend to imply an "either/or" situation, that one proposal can be entertained only at the expense of the other. This is not the case. In the exchange proposal filed June 25, 1984, Marathon offers 2,544.36 acres of privately held surface and mineral estate in exchange for an equal value of public land from within a larger block of 4,487 acres of public land along and in the vicinity of Duck Creek in the Piceance Basin.

Marathon's exchange proposal identifies the selected public lands as being located in the S½ of sections 15, 16, 17, and 18; all of sections 19, 20, 21, and 22; and the N½ of sections 27, 28, 29, and 30, all in Township 1 South, Range 99 West. Discounting Marathon's recent acquisition of the 640-acre Colorado Division of Wildlife Duck Creek property, Marathon's Portland Oil Shale Mining Claims and the 1,480 acres (not 1,560 acres as you indicate) of 84 Mesa disposal site, there would still remain a balance of approximately 2,700 acres of public land that could be considered viable exchange property, should an exchange be deemed to be in the public's best interest.

Response No. 24. ALTERNATIVES (13). Table II-6 provides a summary analysis of each alternative by affected resource for quick reference. A complete detailed analysis is provided in Chapter IV, Environmental Consequences. The reference to the Philadelphia Creek Alternative is correct; this disposal site does allow a greater recovery of oil shale resource than does 84 Mesa—please see Response No. 12 for more details. The issue of the contested mining claims concerning conveyor transport and the granting of a right-of-way was addressed. Although the BLM has been advised against leasing those public lands within the contested oil shale claims, a right-of-way for conveyor transport to either disposal site could be granted.

Response No. 25. COMMON AREA (13, 18, 24). An alternative to the common area has been offered—No Action. In this alternative, all plants and facilities would be placed on Tract C-a. Other than this alternative, there is no feasible and realistic alternative. Neither Philadelphia Creek nor the West Fork of Spring Creek offers suitable topography for plants and facilities. Placing these plants and facilities 5.5 to 7.5 miles away from the mining operation would unreasonably burden the efficiency of the operation. Placing the common area in some other location adjacent to Tract C-a would be hindered by private land patterns and contested mining claims and would not offer any distinct advantages or alternatives to the presently identified site. The common area, as identified in the DEIS, is a reasonable and workable concept backed by the alternative of placing plants and facilities ontract rather than offtract. Any other alternative would not be reasonable or different enough to warrant development of a new alternative.

Response No. 26. AIR QUALITY (14). The problem of determining the impact of the alternative disposal sites was handled by making two modeling runs, one of which determined the total impact of the project, assuming full scale development over a shorter time frame, and assuming the 84 Mesa site was included in the project. The second modeling run used only the emission sources on 84 Mesa, as if it were operating alone. In this manner, we were able to determine the impact of the Preferred Alternative and at the same time to isolate the impact of the disposal site, taking advantage of the mine plan developed for 84 Mesa. The alternative disposal sites would have similar configurations to the 84 Mesa plan; therefore, the impacts due to 84 Mesa could be translated directly to the alternative disposal sites.

The results, as described in the DEIS, showed that only 6 percent of the total project low level TSP emissions were due to disposal operations. In addition, the maximum Class II increment consumption was a result of emissions only from Tract C-a operations (the open pit mine); at the location and time of maximum impact, there was not contribution from the 84 Mesa disposal operations. Consequently, the impacts of the disposal operations were independent of the rest of the project (for maximum increment consumption considerations).

Response No. 27. TAPAS MODELING (14, 22). One of the major advantages of the TAPAS model is its two-dimensional treatment of winds. The use of the TAPAS system to estimate long-range air quality impacts is much more realistic, and probably more accurate, than other readily available models. This is especially the case with the simplistic complex terrain models in the EPA guideline series. In addition, the TAPAS model system has been used in several other EISs and, therefore, can be readily compared with earlier projections. The problem of wind flow over steep terrain may introduce inaccuracies into the modeling results, but another possibly larger uncertainty is introduced simply by ignoring topographic modifications in transporting a plume long distances (50 miles) over complex terrain. This type of transport is poorly understood, partly because there is little data available, and it introduces large uncertainties into the results of any air quality model. The CITPUFF module of the TAPAS modeling system contains a correction factor to address this phenomenon.

As a result, air quality modeling in complex terrain is at an early stage in its development, and improvements and research work are definitely needed. Nevertheless, the TAPAS modeling system is an improvement over existing EPA "sanctioned" models and is a promising step toward better impact assessment.

Response No. 28. AIR QUALITY (14). The emissions from the construction and operation of an offtract disposal site are included in the impact assessment of the DEIS, as noted on page 188.

Response No. 29. DILIGENCE REQUIREMENTS (7, 16). RBOSC has diligence requirements for the development of Tract C-a through the Prototype Leasing Program; however, those requirements have been suspended. Upon issuance of an offtract surface lease for disposal of wastes or by July 31, 1987, this suspension may be lifted. At that time, RBOSC must develop the Tract, petition for another suspension, or give up its leases.

Response No. 30. SOLID MINERALS (17, 24). The greater the area of an open pit mine in the basin, the greater the overall recovery factor (depending on ground conditions and angle of the highwall). Necessary limitations to the areal extent of an open pit mine in the basin would limit overall recovery. Recovery from an open pit mine restricted to the 4,000 acres of 84 Mesa would be less than the 56 percent recovery used for the determination in the DEIS. To attain comparable results, the same recovery factor (56 percent) for Tract C-a was used for 84 Mesa. Any open pit mine in the Piceance Basin would not recover 100 percent of the resource.

Response No. 31. SPECIAL STUDIES (18). RBOSC personnel contributed information and the results of special studies for use in the environmental consequences analysis. According to scoping efforts, special studies were recommended for air quality, hydrology, and reclamation. These studies were undertaken by RBOSC and submitted to BLM as information to be added to the existing body of resource information. Due to the 10 plus years of environmental data collection and monitoring specific to the area, the information was extremely helpful to the overall analysis. Numerous reports/studies, in excess of 150, are referenced throughout the document. Additionally, as indicated on page 8 of the DEIS, the relationship to other plans and documents is outlined. All information was received and carefully reviewed by BLM staff members with expertise in the respective disciplines. As required by NEPA, 1502.7, each resource specialist is listed in the document in Chapter V — List of Preparers. BLM assumes the final responsibility for the adequacy and accuracy of all analysis presented in the DEIS.

Response No 32. SCOPING (18). The "scoping committee" referred to on page 9 of the DEIS was required to research and identify suitable site-specific locations as alternative disposal sites to the proposed location on 84 Mesa. This committee was solely involved in the determination of the technical feasibility of site selection, based on three criteria:

1. A lease could not be issued on unpatented mining claims.

2. A right-of-way across the unpatented mining claims west of Tract C-a could be issued, but would become null and void if the claims were to become patented. RBOSC would be advised to make prior arrangements with claim holders to assure future access in the event of right-of-way termination at the time of mining claim resolution.

3. Private lands could be considered part of the disposal site alternative if a reasonable possibility existed, that the use of this private land could be secured by RBOSC.

Using these criteria, the scoping committee investigated numerous sites for their potential as disposal locations. The sites were judged according to their ability to support a logical lease configuration that would maximize volume capacity, have reasonable access, and afford the opportunity for environmental controls.

RBOSC was represented on this committee to contribute technical advice only as pertains to solid waste disposal. This committee did not attempt to identify issues.

Public scoping meetings were held in Meeker and Golden, Colorado. A notice to hold public scoping meetings and to prepare an EIS was published in the Federal Register (Vol. 49, No. 131, page 27826) on July 6, 1984. Other public notification of the scoping process included press releases and mass mailings. Public scoping comments were received and are summarized in Chapter V of the DEIS. Other consultation and coordination included input from the Craig District Citizen's Advisory Council. A special subcommittee from the Council was appointed to review and make recommendations on the Proposed Action and alternatives. Scoping is a method of determining, in a meeting or series of meetings held by the sponsoring agency with the participation of interested parties, which issues the EIS shall emphasize. Clearly then, our "scoping process" was not conducted outside the public process, but rather hand-in-hand with this process via consultation and coordination.

Response No. 33. ALTERNATIVES (18). The Proposed Action (84 Mesa) and the driving force of the DEIS, presents the "on-the-resource" site to be analyzed. In order to have a true option or alternative to the Proposed Action, an "off-the-resource" choice had to be identified and analyzed. (Note: the "off-the-resource" alternative was first suggested by the Colorado Department of Natural Resources, during the preliminary EA). Another "on-the-resource" disposal site would be too similar to the Proposed Action to be a real alternative and to give decision makers a true choice. But, just because the "off-the-resource" option was made available as an alternative does not in any way intend that "off-the-resource" is the preferable choice. The Proposed Action (84 Mesa) and the two over-the-bluffs sites provide contrasting situations that fully demonstrate a full range of alternatives.

Response No. 34. ALTERNATIVES (18). The four major alternative omissions presented by Friends of the Earth are addressed in the document. Major omissions 1-3 are part of the No Action Alternative—please reread the text. Major omission 4 is also partially contained in the No Action Alternative, but additionally what is being implied is a diligence requirement for RBOSC before using offtract disposal. Please see responses 6 and 29 regarding diligence.

Response No. 35. COST/BENEFIT ANALYSIS (18). NEPA regulations, Part 1502.23 states in part: "For purpose of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations." Since a current market value for produced oil shale does not exist, it was determined to be inappropriate to try to compare resources between alternatives on a strictly monetary cost/benefit ratio. Relative quantities of mineral resources were estimated and the comparisons were made regarding resources lost on a quantitative basis with no indication of dollars (Tables IV-11 and IV-12). Please see response number 9 for more details.

Response No. 36. WATER DIVERSIONS (21). The developments and facilities necessary to mandate water diversions on the White River and possible reservoir structures resulting in water depletions are tied to the development of Tract C-a, not offtract leasing for waste disposal. We agree that all environmental impacts known to result from the decision to issue or not issue an offtract waste disposal surface lease should be addressed. We disagree, however, with your position regarding the water diversions and reservoir structures, as BLM maintains those impacts associated with water diversions and depletions are tied to the development of Tract C-a itself.

Response No. 37. WILDLIFE (21). BLM believes that water use analysis is premature and beyond the intended scope of this document. At this time, BLM is unable to provide detailed, nonspeculative water use information necessary for the development of a substantive biological assessment on listed species. However, BLM remains committed to the environmental analysis process that may include the preparation of an EIS, based on the submission of the DDP that will provide an opportunity for comprehensive evaluation of a consolidated mine package. We wish to defer water-related impact assessments for listed species until the DDP stage when accurate determinations of water use, sources, and disposition can be made. Since on-the-ground development of C-a will probably occur years from now, BLM will initiate Section 7 Consultation, based on information updates, design change, and species list changes at that time.

Our position is stated with the knowledge that lease issuance for offtract disposal shall in no way precondition DDP approval or authorizations for other ancillary facilities. An offtract lease confers no right on the holder to violate any terms or conditions of the Endangered Species Act. Regardless of leases held by RBOSC, tract development cannot be authorized in a manner inconsistent with the mandates of the Endangered Species Act, nor can development proceed in a manner that could jeopardize the continued existence of any listed or proposed species.

Response No. 38. RECLAMATION (21). This reference to the potential development scenario of Tract C-a was provided for the reviewers benefit to provide an overview of the overall project. Specifically, it is presently RBOSC's intentions to allow the open pit mine site to flood, thus forming a lake once the waste disposal site is filled. Therefore, no further analysis in the EIS is provided as the open pit is on Tract C-a, not the offtract lease areas under consideration for waste disposal.

Response No. 39. WILDLIFE (21). We agree with your comment and have changed committed wildlife-related mitigation accordingly. However, BLM retains the final approval authority.

Response No. 40. WILDLIFE (21). Requirements for raptor nest surveys and nest site protection have been incorporated in committed mitigation.

Response No. 41. LAND USE (21). The text will be corrected to reflect your viewpoint that wildlife use was a principal use of these lands. Please note, BLM believes that wildlife is an intrinsic characteristic of the land, not just a land use as your comment suggests.

Response No. 42. WILDLIFE (21). Statements such as this are meant to be examples of mitigation forms available through implementation of the Wildlife Mitigation Plan. BLM believes that it is inadvisable to stipulate specific techniques or goals at this time, and that in the interim, between leasing and development, increasingly effective mitigation/reclamation practices and strategies will become available and will be applied as necessary within the framework of the Wildlife Mitigation Plan.

Response No. 43. WILDLIFE (21). BLM requires that all powerlines and electric transmission facilities on public land conform with accepted raptor protection designs; a stipulation to this effect will appear in the Wildlife Mitigation Plan at the DDP stage.

Response No. 44. LIVESTOCK GRAZING (21). This paragraph deals only with uncommitted mitigation that could be possible but not mandatory. Nothing is said of maximization for livestock grazing. Should this uncommitted mitigation ever be developed, multiple-use constraints that presently guide rangeland improvements would also be applied to any improvements that should be developed as uncommitted mitigation.

Response No. 45. OPEN PIT (22). This EIS addresses the need for and impacts of offtract lands for waste disposal. The document provides a very general overview of an open pit mine on Tract C-a for the readers' benefit only. To attempt to identify and assess significant impacts associated with various foreseeable configurations of the pit is well outside the scope identified on page 7 of the DEIS. These aspects of Tract C-a potential development scenarios will be addressed once RBOSC submits a revised DDP, which incorporates offtract disposal and open pit mining of Tract C-a.

Response No. 46. HYDROLOGY (22). Those reservoirs and detention dams and other diversion structures adjacent to the waste disposal piles that meet the criteria would be submitted to the State Engineer for review. Plans and designs have not yet been undertaken, pending a decision on offtract leasing. If a site for waste disposal has been offered for lease, RBOSC probably would begin the engineered design phases for the disposal pile and detention structures associated with the disposal pile. Lease stipulations would require compliance with applicable state laws and codes.

Response No. 47. HYDROLOGY (22). Although RBOSC proposes to use catchment and diversion dams on several unnamed intermittent streams to divert water around the proposed shale pile for each alternative, there should be no impact to downstream senior water rights. Water would be retained in the catchment dams long enough to settle out suspended solids; it then would be released for downstream use by senior water rights. There are no known senior water rights in the direct disposal areas that would be impacted. Current water uses in the disposal areas for livestock and wildlife watering would be met under RBOSC's Plan for Augmentation provisions associated with withdrawal and use of groundwater on Tract C-a.

Response No. 48. RECORD OF DECISION (25). The Record of Decision (ROD) can be issued as soon as 30 days after the Notice of Availability of the final EIS is published in the Federal Register by EPA. This is the earliest it may be issued; however, it can be issued anytime after that 30-day period, as long as the information presented in the EIS is accurate and current.

Response No. 49. HYDROLOGY (GROUNDWATER) (24). The EIS does not state that the alternative disposal sites (i.e., Philadelphia Creek and Spring Creek) have a greater potential for groundwater contamination than the proposed site (84 Mesa).

The comparison of the alternative sites with the proposed action, with regard to hydrologic impacts, goes beyond the effects on deep groundwater. The extent and potential utility of the upper aquifer in the Piceance Basin around Tract C-a is well documented. Although less is known about such systems under the alternative sites, it is implied in the Affected Environment chapter that such deep aquifer resources are limited, due to the limited permeability, water quality, and extent of porous zones in the underlying strata. DEIS evaluations of near-surface materials identified very tight, fine-grained material, clay beds, etc., in the alternative sites, indicating limited potential for vertical movement of water. 84 Mesa is underlain by the more porous Uinta sandstone.

Leachate exiting the bottom of the pile at 84 Mesa is expected to move predominately downward through the Uinta to the Green River Formation. Some groundwater in the Uinta Formation would be affected. Water quality in the Uinta Formation at well GS-M5U on 84 Mesa has averaged over 2,500 mg/l TDS, much higher than commonly observed in the upper aquifer. The extent of the aquifer in the Uinta is uncertain. When groundwater gradients are reestablished following mine dewatering movement would be: (1) more or less laterally to the northeast, mixing with spring discharges and discharges to Yellow Creek from the upper or lower aquifers; or (2) continued vertical flow that would enter the upper Uinta aquifer through fractures in the Green River Formation.

As discussed, recharge to deep aquifers is expected to be less in the alternative site areas. Leachate exiting the bottom of the disposal pile would tend to move laterally, entering the alluvium and surface streams of Douglas Creek, Spring Creek, and then the White River. Because deep percolation of leachate may be limited in the alternative sites, the release to surface streams (with resultant potential effects in water uses) would be more rapid than at 84 Mesa. Capturing leachate before it enters surface waters is an option that could be employed during project life as suggested. However, the long-term operation and maintenance of such facilities at any of the sites is not a reliable mitigative measure at this time.

Volumes of stored groundwater beneath the 84 Mesa 6,400-acre site may range from 100,000 to 1,000,000 acre-feet in the Green River and Uinta formations. The aquifer there will yield usable quantities, and the water is of a quality usable for many purposes, including wildlife, livestock, irrigation, and most uses at an oil shale plant. In contrast, the volume of groundwater in storage beneath the other sites is thought to be small, the aquifer yields very low, and the data suggest the groundwater is of significantly poorer quality. This is perhaps the most significant difference in hydrologic characteristics between sites.

Thus, the trade-off between 84 Mesa and the two alternatives is: (1) the potential for more rapid release to surface systems in the alternative sites versus (2) deep groundwater effects with the 84 Mesa site. However, deep groundwater effects of one site versus another is one of the many issues considered.

There is quantitative data from laboratory studies to support slow rates (340 years) of downward flow in the Uinta Formation from the base of the pile to the water table (Brown 1984). However, there is also data supporting rapid downward flow in the Uinta Formation. There is significant experience that more rapid flow occurs in heterogeneous fine-grained rock masses than commonly predicted from primary permeability data, because of very large values of permeability caused by fractures and other secondary features. Fractures commonly are one to three plus/minus orders of magnitude more permeable than equivalent volumes of "primary," unfractured rock. Experience at four oil shale mines in the basin, all with from 300-800 feet of overlying upper Green River Formation and Uinta Formation (marlstone and sandstone similar to that at 84 Mesa), indicate the existence of rapid mine inflow response to heavy snowmelt and locally to storms at the surface. These mines, unlike the mine at Tract C-a, normally have very little water inflow and therefore such changes in flow are easily recognized. Reported response times to storms and to above average snowmelt periods at these mines typically range from a few days to a few months. In spite of the lack of definitive data at 84 Mesa, the physical process of storm runoff and snow melt effects in stream beds may be quite different than recharge through the disposal pile and down through the Uinta Formation. This empirical evidence of rapid down flow cannot be ignored. Transit time could range from hours should transient high runoff events on 84 Mesa cause effects like those observed from local stream channels; to 300 years (as indicated in Brown 1984). Page 214 paragraph 2, fourth sentence of the DEIS states that portions of the leachate may move more rapidly.

Response No. 50. WASTE DISPOSAL (24). The estimates given in the DEIS regarding the amount of spent shale and overburden materials that could be returned to the open pit on Tract C-a have been reviewed with reference to those EPA reports cited in the comment letter. Those figures presented in the DEIS are correct; the data EPA provided on generic studies is not applicable to this case. Apparently the EPA reports cited do not use a safety factor and are stacking the wastes back into the pit on a 1 to 1 slope. In the analysis used in the DEIS, a 4 to 1 slope with fill only to the lowest conveyor system level was used.

Two hundred million cubic yards of overburden will be backfilled into the pit. By the time the proposed 84 Mesa disposal site has been completely utilized, less than one-half of the oil shale resource recoverable from Tract C-a will have been mined. Safety and operational constraints limit the backfill slope angle and the area available for backfilling at this stage of the mine development. The scheduling of backfill placement in the pit is site and plan specific. Return of spent shale to the open pit is not an approach that should be pursued simply as a resource-saving device. Placing of large amounts of spent shale back into the open pit could result in groundwater quality impacts in excess of that anticipated for surface disposal piles. In surface piles, leachates will be released at relatively low rates over a long period of time (centuries). Disposal within an open pit on Tract C-a, because of direct interaction with the aquifers, could result in a high rate of release, although over a shorter time period. The resultant increase in TDS in a small area of the aquifer could be greater than with a surface disposal pile.

Response No. 51. SCOPE (24). The primary purpose of this EIS is to identify potential environmental impacts anticipated from the Proposed Action and alternatives (e.g., offtract waste disposal leasing). The analysis is project specific to the degree that is necessary for a decision to be made on offtract leasing. The EIS does not further analyze development on Tract C-a itself, unless the impacts would be directly related to the development of an offtract lease. For example, production rates, retort technology, and tentative schedules are identified. Other more specific information would have to be analyzed by a subsequent analysis of the DDP. The revised DDP would include a specific identification and analysis of ancillary and support functions for the mining/disposal operations. These functions would include water diversions/depletions, reservoir structures, pipelines for product transport, construction camps, electrical transmission requirements, specifics on waste disposal plans (pile profiles), etc. This would also include details that would be specific to the particular offtract site selected, technology that is still in the developmental stage, and other operational aspects of production not completed by the project proponent at this time. Significant environmental impacts would occur, regardless of the alternative selected, including the No Action Alternative. Although all resource impacts are fully addressed, the main focus of the EIS is to assess the potential consequences of the proposed disposal of several billion cubic yards of waste materials on federal lands.

Response No. 52. ALTERNATIVES (24). The advantages and disadvantages associated with the Philadelphia and Spring Creek alternatives are discussed on pages 214-218 of the DEIS. For leachate control, see response number 49.

Response No. 53. NO ACTION ALTERNATIVE (24). The 2.72 million cubic yards of backfill material represents the surplus material that the disposal pile would not accommodate when the ore production was maximized. The objective was not the maximization of backfill material. The waste pile material would not be returned to the pit, as the pit itself could be a valuable asset to future development of oil shale.

Response No. 54. WASTE DISPOSAL (24). The text has been corrected. Runoff is a function of several factors; precipitation is the only factor of probable significant difference between sites. Leachate production is also a function of several factors, including precipitation. A difference in "control" measures for runoff is that the 84 Mesa site drains into several tributaries of Yellow Creek (eight dams and diversion structures are shown on Figure II-12 (page 37)); the Spring Creek site is drained directly by only one stream; and the Philadelphia Creek site is drained directly by Philadelphia and Cow Creeks. The use of BACT may be effective at either of the three sites, with fewer structures to maintain at the alternate sites. BACT of this type is a short-term solution only.

Response No. 55. PROTOTYPE LEASING PROGRAM (24). Oil shale development is not a viable industry today, but a program can be developed for when the demand for oil shale occurs. Because of the greater expense and lead time to dispose of wastes to the alternate sites, leasing of the Preferred Alternative site for disposal would be a stimulus to the earlier development of Tract C-a.

In comparing the disposal to the alternative sites and disposal to the preferred site, using the variable of resources that were forgone, the preferred site was the better.

To say that "development of the resource is not currently planned" is not entirely accurate. Without an assured offtract disposal site, development of Tract C-a would be more uncertain. The offtract lands leasing process is an initial step in defining the configuration of a project for Tract C-a. Until lands are defined, the type of project to be pursued cannot be defined and the economics analyzed. The timing of development is uncertain due to technology and economic issues, but development of the resource is anticipated.

There is no reference to $1.50 per barrel cost on page 2.

Response No. 56. MINE/SCOPE (24). The impacts associated with the open pit on Tract C-a (i.e., flooding) are outside the scope of this EIS. However, the concerns about water quality in an abandoned flooded open pit are valid. Assuming ambient groundwater conditions persist after mining, as disturbed by C-a dewatering, etc., the hydraulic head in the lower aquifer at C-a would remain lower than in the upper aquifer (except for a small area in the extreme northeast corner of the lease); thus, the hydraulic gradient between the flooded pit would be such that groundwater would flow into the upper part of the pit from the upper aquifer, and out of the lower part of the pit into the lower aquifer. On Tract C-a, the lower aquifer is two to three times more permeable than the upper aquifer. Water quality in the upper aquifer (based on many samples during several years of mine dewatering) is about 900-1,000 mg/l; quality in the lower aquifer (based on well data) is about 1,000-2,300 mg/l (RBOSC, Final Baseline Report Vol. 1 1977, page 11-270, Figure 2.78). These conditions suggest that the water quality in the flooded pit would more resemble that of the upper aquifer.

The backfill material in the pit would degrade the flooded pit and lower aquifer groundwater to some extent. Leachate from raw shale and overburden can contain high concentrations of TDS (10,000-30,000). Because of hydraulic breaching in the two aquifers by the pit, groundwater outflow from the lease area via the upper aquifer would be somewhat diminished. This is because a drawdown cone would be developed in the upper aquifer in response to flow into the pit. This diminished flow could affect flows at nearby springs. The quantitative effects on water in the pit of leachate from overburden and raw shale waste is not known, but could significantly degrade groundwater in the lower aquifer for a very long time. These possible impacts resulting from the mining of Tract C-a would be assessed as part of the review of the revised DDP to be submitted, as required by the Prototype Leasing Program.

Response No. 57. DEWATERING (24). The rates of the dewatering requirements are directly related to the mining of Tract C-a. Although this water would be utilized for spent shale moisturization, the amount that would be produced is outside this EIS's scope.

If the required dewatering does exceed the numbers used (2,900 gpm for upper aquifer and 3,000 gpm for lower aquifer) due to a different pit development schedule or inaccurate hydrology assumptions, the excess water would probably be reinjected or in the case of the upper aquifer, discharged to surface streams. If this additional reinjection became significant, it could increase flows of down gradient springs and gaining streams (i.e., areas of aquifer discharge). Generally, the environmental impacts of an increase in groundwater discharge would be minor but might increase or otherwise change the vegetative cover and yield along Yellow Creek, Corral Gulch, and Stake Springs.

Reinjection would be to the same aquifers that produced the waters; therefore, the potential for increased TDS in the alluvium and upper aquifer would be minimal.

With regard to Modular Development Program experience for dewatering, a peak production of 3,200 gpm was reached for only a few days; the peak average monthly rate was only 2,850 gpm. Water production exceeded a 2,000-gpm rate for only about 6 months in 1978, and the average over the 6½-year period from January 1978 to June 1984 was 1,560 gpm.

Many uncertainties still exist in predicting mine dewatering rates, which would result in different impacts for different alternatives. Early modeling studies by USGS (Weeks et al. 1974, p. 73) predicted 3,100-4,000 gpm inflow to an open pit mine that bottomed at the base of the Mahogany Zone. Much of this inflow would be supplied by upward flow from the lower aquifer. No estimates of inflow were made for a full-depth open pit. RBOSC (Final Baseline Report 1977, p. 11-210) data indicate that the lower aquifer is nearly three times as permeable as the upper aquifer. Therefore, inflows to a fully penetrating pit could be much greater than to a shallow pit. RBOSC (DDP 1976, Vol. 3 p. 8-5-3) estimates that a large pit (120,000 TPD) would require dewatering rates of 6,700-9,000 gpm. The EIS estimates of dewatering are based on the experience of dewatering of the Modular Development Pilot (MDP) mine on Tract C-a and on the most recent modeling of dewatering of a commercial mine on Tract C-a. These represent the best estimates at this time, although uncertainties still exist, and it is possible that dewatering rates could be greater than estimated. Higher rates would minimize the need for importing surface water to the site from the White River and diminish the resultant surface and hydrologic effects. Higher dewatering rates could result in greater aquifer draw down in some areas, although this might not necessarily occur. Drawdown accompanying higher inflow rates could have a greater adverse affect on spring and stream flow in the area. These effects would be mitigated with the required augmentation program. Should groundwater flow gradients steepen from the 84 Mesa area toward the mine, it could increase the chance of leachates appearing in mine inflow during project life. These conditions could minimize migration of leachate in groundwater from 84 Mesa downstream toward lower Yellow Creek and White River during project life, but could result in an accumulated mass of leachate moving down gradient upon cessation of mining.

Early during the project, high rates of mine inflow could exceed water demand, the excess presumably would be discharged to surface flow in Corral Gulch or reinjected into the aquifer system at some distance from the mine. Some data collected during past operations at Tract C-a suggests that rises of groundwater levels by mine water recharge in previously unsaturated alluvium resulting in leaching of salts from the alluvium, and the newly stored groundwater could be of appreciably lower quality than the original mine discharge water.

Response No. 58. WASTE DISPOSAL (24). This was an oversight. The drawing should show a bottom layer of overburden. Please see new Figure III-7 in text corrections.

Response No. 59. PROPOSED ACTION (24). If the upgraded oil or other products are deemed "new" materials being introduced into the market place, then a Premanufacturing Notice, as required by the Toxic Substances Control Act, would be prepared. The text has been corrected to reflect this position.

Response No. 60. HYDROLOGY (24). The source of cooling water would be the lower aquifer plus treated process water. The treatment technologies used would determine the trace element and organic content of treated process water used for shale cooling. Based on the alkaline character of these waters, trace element concentrations are expected to be low. Figure II-11 (page 31) shows sources of cooling water from a waste water boiler and from the ammonia recovery process. As stated in the text (page 36), oils would be reduced in an API unit; acid gases, light hydrocarbons, H_2S, etc., would be reduced by steam stripping; and ammonia would be reduced using the Phosam-W process. Because of the temperatures involved and the treatment, volatilization of the organics is likely, as is trace element release. The level of risk involved with these releases is presently unknown. See also response number 79.

Response No. 61. PILE DESIGN (24). Lift thickness will be determined in order to achieve minimum practicable permeability of the compacted shale. The overburden, subore waste, and spent shale would be mixed in the pile, except for the compacted layers. Permeability of the compacted layers and bulk of the pile is not certain, it would be in part dependent on the characteristics of the actual material used and on any subsequent pile movement that could cause fracturing. It is doubtful if the low permeability values (10^{-6} to 10^{-7}) determined in the laboratory for processed shale would be achieved in field practice. Heterogeneities in the pile materials and cracking due to normal settling could result in local zones more permeable than the disposal pile as a whole.

Pile construction features are:

1. Liner thickness at least 10 feet.
2. Processed shale and overburden will be mixed.
3. Liner and cover permeability 2.5 x 10^{-7} cm/sec (page 43).
4. Bulk of pile permeability 1 x 10^{-4} to 6 x 10^{-6} cm/sec.

Response No. 62. HYDROLOGY (24). In the near term (life of the project) leachate materials that exit the toe of the pile or run off of the pile would be collected in runoff ponds. Such runoff waters would probably be used for dust control or compaction activities on the spent shale pile before final covering for reclamation. See Appendix B — Committed Mitigation for more details (surface water quality).

Response No. 63. HYDROLOGY (24). Text changes have been made to incorporate this comment. See revised Chapter IV, Groundwater Quality —Leachate.

Response No. 64. HYDROLOGY (24). The basis of evaluation of initial leachate movement is that it would be under unsaturated conditions via gravity. Thus, initial flow would be predominately downward into the Uinta and not laterally where it might combine with surface runoff in the control pond. Volumes, quality, and controls are discussed in the revised Chapter IV, Groundwater Quality — Leachates.

Response No. 65. HYDROLOGY (24). Pile design and construction will take into account the potential for slope instability, and should thus minimize the problem. Drains are not planned at this time. We agree that a retro-fit would not be easy nor inexpensive.

Response No. 66. PILE DESIGN (24). These conditions are noted in Chapter IV of the DEIS (page 210) as follows:

"The effect of waste rock admixtures on the transit time for seepage through the unsaturated pile depends on the way in which the rock is emplaced. If the rock is thoroughly mixed with the shale, then the transit time may be essentially unchanged, as the water will simply move around the rock particles, and the transit time will be determined by the moisture content and the hydraulic conductivity of the processed shale. If differential settling occurs, then fracturing of the spent shale could occur around large rock fragments. On the other hand, if the waste rock is emplaced in layers, the transit time would be reduced. The transit time of the water through a layer of material is proportional to its effective hydraulic conductivity. The hydraulic conductivity is much higher for waste rock than for processed shale. The water transits the rock layers essentially instantaneously when compared to the time taken to transit a layer of processed shale. Movement rates of leachate downward through the heterogeneous pile is highly uncertain, based on the previous description, the general time frame of leachate movement through the pile would be on the order of 1,000 years or more. However, because of a lack of homogeneities in the pile, some leachate could move through the pile in a much shorter time, perhaps on the order of 100 years."

Response No. 67. HYDROLOGY (24). This has been proposed at other projects and by some research studies. However, underdrains probably are not feasible for long-term control of leachates.

During project life, leachate entering the upper aquifer would flow to the mine pit and be cycled back through the system. Once production of Tract C-a ceases, the aquifer would once again flow northeastward, and some portion of the leachate exiting the pile and entering the groundwater aquifer could be released somewhere along Yellow Creek were the upper aquifer surfaces. As stated in the DEIS (page 211), the leachate is expected to significantly degrade the groundwater quality beneath the disposal pile (all three disposal alternatives).

BACT for leachate control is successful reclamation of the disposal pile as discussed on pages 315-316 of the DEIS.

Response No. 68. HYDROLOGY (24). The effects of vapor transport may occur; however, predicting direction of effects in a shale pile is highly uncertain. There is research taking place on this subject, but it has not been demonstrated in field conditions. Research studies suggest it may be possible to prevent or greatly delay movement of dissolved solids from a processed shale pile to the environment by the provisions of a carefully engineered foundation ventilation system. Such a system could ensure that all water that leaves the pile would be in a vapor phase, hence no solids would be transported.

Although it is an interesting concept that vapor transport would dominate in a "dry" foundation and infiltrating water would be removed as vapor, the concept has not been tested. For example, the sources of energy for evaporation and vapor removal as the pile cools have not been demonstrated. Also, the operation of such a system with seasonal variations in air temperature is a matter of considerable concern. Thus, the contribution of vapor transport in the disposal pile is not known. Further testing, perhaps in the field, would be needed to evaluate the role of this process in mitigation of leachate discharges. With these uncertainties, our evaluation of gravity drainage under unsaturated conditions is appropriate.

Response No. 69. HYDROLOGY (24). Drawings show diversion channels around the upper end of the pile at Spring Creek and 84 Mesa. The pile at Philadelphia Creek would extend upstream and laterally to the drainage divides, thus no upstream drainage would exist there. Catchment dams located upstream from the working level of the disposal pile would be constructed so as to cut off flow in the alluvium, as well as surface runoff. Diversion structures around the upgradient perimeter would be the best solution to postabandonment surface/alluvial inflow to the pile area.

Response No. 70. ALTERNATIVES (24). The placement of processed shale in the pit in the underground/open pit option could increase potential groundwater quality problems. The waste materials would be conveyed to the pit floor and stacked in similar fashion to waste pile construction. Processed shale deposition below the existing water table in a pit could be lined with a compacted liner of spent shale.

A correction will be made to the 133 million cubic yards. It should read 1,331 million cubic yards. This includes the 1,329 million cubic yards from underground in addition to the 2.72 million cubic yards already in the pit.

Mining under the plant site would not be prudent because of the subsidence potential. It should be noted by the reviewer that less than half of the recoverable resource on Tract C-a could be recovered because of the volume restrictions related to the 84 Mesa site.

Response No. 71. ALTERNATIVES (24). The EIS addresses the application from RBOSC. Their proposal identifies 84 Mesa as their preferred site. As 84 Mesa is the "on the oil shale resource" alternative, BLM management determined the other alternatives to be analyzed would be "off the resource." Another on-the-resource site was simply not necessary; therefore, those areas east, north, and south of Tract C-a were rejected in part because they did not meet the criteria established "off the oil shale resource."

Response No. 72. AIR QUALITY (24). Union trace element data refers to Unishale B Process. It is difficult to speculate on the impact of trace element emissions if they are "substantially higher" than the RBOSC pilot plant results, since very little is known about trace element emissions and their effects. Although EPA has unpublished tests indicating that trace element emission may be higher for mercury, cadmium, and arsenic, those results may not be directly comparable to the results from RBOSC's Lurgi pilot plant, since emissions may be process-specific. The SO_2 and NO_x data for a number of oil shale projects (including Union and Chevron) are presented in the cumulative impacts section, page 195. The discussion on trace element emissions will be modified to reflect uncertainties as follows:

". . . most of the substances are emitted at extremely low concentrations, generally near the lower limits of detection of the measuring techniques. There is a larger uncertainty factor in these data, since they were taken at a pilot plant, were close to the limits of detection, and may not be representative of other retorting processes."

Response No. 73. AIR QUALITY (24). Although the 20 percent consumption of the 24-hour Class I increment for SO_2 at Flat Tops and 16 percent consumption at Mt. Zirkel may in part limit the extent of other oil shale developments, BLM does not believe these fractional consumptions of increments are significant.

Response No. 74. HYDROLOGY (24). There is no compelling evidence that overall, long-term surface water quality impacts would be substantially different at any of the sites. Water quality effects could be less significant at the two alternative sites, because the "receiving waters" are of poorer quality than at 84 Mesa. However, short-term surface water quality impacts may be greater at the alternative valley fill sites because leachates are expected to exit the toe or bottom and move laterally to streams rather than into the groundwater. A few wet years in the area will not change the sites in relation to one another.

Response No. 75. AIR QUALITY (24). Referring to the EPA document number EPA-600/8-83-005 (page 137), table 5.1-7, the total fugitive emission rate for particulates is 52 lb/hour, which is 3.3 percent of the total particulate emission for the plant. The Lurgi flue gas emission rate is 1,106.6 lb/hour, or 71 percent of the total emission. Since RBOSC, in the No Action Alternative, assumes aboveground retorting using Lurgi technology, it is apparent that the major difference between the No Action Alternative and the other alternatives is the production rate. Therefore, the qualitative analysis in the No Action Alternative impact section is sufficient to differentiate it from the others.

Response No. 76. PREFERRED ALTERNATIVE (24). To develop Tract C-a using surface mining methods, it would be necessary to dispose of the initial wastes offtract. If the initial wastes were placed ontract, it would become necessary to move them to 84 Mesa as the pit was expanded. Development of Tract C-a, which was contemplated at the time of bidding and lease issuance, was predicated on total tract development and offtract disposal. The winning bid was a "good faith" amount based on the above stated conditions. The ultimate development of 84 Mesa should be addressed when such action is more imminent. The waste pile cannot be replaced to Tract C-a for disposal into the open pit, because Tract C-a is restricted by area boundary. Unless Tract C-a were expanded in area sufficient to become a traveling pit (can consume its own wastes), it could not consume the waste pile on 84 Mesa.

Response No. 77. ALTERNATIVES (24). Those irreversible and irretrievable commitments of resources shown for each alternative are realistic, accurate, and correct. Minor changes to the dawsonite and nahcolite numbers were made in response to comments. Please see response number 20 for further information.

Response No. 78. DISPOSAL PILE (24). The nature of "pile failure" is not described in this comment. "Failure" would most likely take the form of erosion of the material overlying the processed shale or slumping or flowing of segments of the pile around its perimeter. Either could result in undesirable materials entering Yellow Creek or entering streams at the other sites.

During the operational period, runoff from the disposal pile would be controlled and collected in basins around the perimeter of the pile. Collected waters would either be used for dust control on the pile, for operational needs elsewhere, or treated and discharged in Yellow Creek. Any such surface discharges would be subject to state or federal discharge permit regulations.

Failure of these control structures is highly unlikely. They will be engineered with the highest of safety factors and will be continually monitored and modified if necessary during project life for positive determination of stability factors.

Response No. 79. HYDROLOGY (24). Treatment designs cannot be specified at this time. This would be the subject of future permit considerations. Several techniques, including various combinations of stream stripping, activated sludge biotreatment, and activated carbon treatment, have been evaluated.

The results in Table 1 show that treatment can provide significant reductions in some organic compounds, ammonia, and phenols. The work on wastewater treatment was done by Amoco Research on samples from lurgi pilot plant operations in Germany and Harmarville, Pennsylvania (PDU).

Response No. 80. HYDROLOGY (24). Field investigations the past 2 years indicate most of the springs appear as described in the comment. However, some springs, particularly in the West Fork of Spring Creek, may be recharged higher (laterally) up the valley wall and more distant from the discharge point thus less affected by the pile. The DEIS does address the situation described on pages 216 and 218, as well as page 220. Mitigation is described on page 219.

Response No. 81. WILD HORSES (2). The short-term referred to in this narrative is the 56 year project life. Those habitat features lost could be regained in the long-term once successful reclamation of the disposal pile/site has occurred.

Response No. 82. LEASE PERFORMANCE STANDARDS (21, 24). Respondents have questioned the adequacy of the committed mitigation presented in the DEIS for several environmental resources. Appendix B in this final EIS presents the committed mitigation for each resource, wherein some changes have been made.

The offtract waste disposal lease will have environmental protection stipulations attached. Stipulations that are directed at achieving performance standards have been developed for the Preferred Alternative (84 Mesa). These standards are listed in Appendix C.

Those performance standards presented in Appendix C are not all inclusive, but do provide a good representation of the type of performance standards that may be included in the lease for offtract waste disposal. If the decision to lease a site other than the Preferred Alternative is reached, standards will be developed for that alternative.

TABLE 1
QUALITY OF LURGI PROCESS WATER AND TREATED WATER 1/

Parameter	Lurgi Raw Water		Lurgi Water Treated by Various Processes 2/				
	Germany	PDU	1	5	2	3	4
pH	8.3	9.3	--	9.7	--	--	--
SOC	4,255	7,003 (TOC)	416	3,511 (TOC)	840	45	175
SCOD	11,300	23,100 (COD)	1,100	11,685 (COD)	2,300	140	523
NH_3-N	4,872	7,370	103.5	106	90.5	<1	229
Phenol	69.2	94	<1	33	<1	<1	<1
TKN	.522%	9,980	--	989	--	--	--
TOT.P	1.12	--	--	--	--	--	--
TDS	1,404	--	--	--	--	--	--
Sulfide	4.3	2.7	--	6.7	--	--	--
CN	1.41	1.22	--	3.14	--	--	--
NO_3	--	--	<1	--	<1	100	<1
Arsenic	0.4	.004	0.3	0.39	0.3	0.3	0.3
Boron	<0.05	.68	0.1	0.45	0.2	0.1	0.1
Barium	0.46	ND	0.5	ND	0.9	<0.003	0.6
Beryllium	--	ND	<0.001	0.07	<0.001	<0.001	<0.001
Cobalt	--	ND	<0.05	ND	<0.05	<0.05	<0.05
Copper	0.15	ND	0.3	ND	.03	<0.01	0.06
Fluoride	<1	1.7	0.4	5.7	0.4	0.4	0.4
Iron	--	2.2	0.6	1.72	0.40	0.36	0.4
Manganese	--	--	<.01	ND	<0.1	0.03	<0.1
Molybdenum	--	0.6	<.04	ND	0.04	0.04	<.04
Selenium	0.79	ND	.54	--	0.13	0.06	0.10
Vanadium	--	ND	<.1	ND	<.06	0.05	<.01
Zinc	<0.05	ND	<.8	ND	<.08	<.08	<.08
Mercury	.0006	--	<.0002	--	<.0002	<.0002	<.0002
Lithium	--	ND	0.2	ND	0.03	0.03	0.2
Chromium	--	ND	--	ND	--	--	--
Cadmium	--	ND	--	ND	--	--	--

1/ All units are ppm except pH (standard units). -- Means not analyzed. ND Means not detected.

2/ Treatments 1-4 are on process water from lurgi pilot plants in Germany, which are steam stripping, granular activated carbon (GAC), GAC/activated sludge, and powdered activated carbon/activated sludge. Treatment 5 is for PDU water, with steam stripping treatment.

CHANGES TO THE DRAFT EIS

CHANGES TO THE DRAFT EIS

CHAPTER II — DESCRIPTION OF THE ALTERNATIVES

PAGE 32

Column 1, after sixth paragraph insert:

As a result of the upgrading systems described above, the upgraded oil or other products produced may be deemed "new" materials being brought into the market place. If this is the case, RBOSC would then file for a Premanufacturing Notice, as required by the Toxic Substance Control Act.

PAGE 36

Column 2, fourth paragraph, insert after first sentence: Treatment technologies have been developed that should make treated process water suitable for safe surface discharges.

PAGE 41

Figure II-16: See new figure.

PAGE 43

Column 1, sixth paragraph, delete last sentence: In the. . .from the pile slopes).

Column 2, second paragraph, change fourth and fifth sentence to: Although this assumes a uniform saturated hydraulic conductivity of compacted processed shale (2.5 x 10^{-7}) throughout the disposal pile, the pile will not be compacted throughout. Therefore, the hydraulic conductivity of most of the processed shale pile should range from 1 x 10^{-4} to 6 x 10^{-6} cm/sec., with locally higher permeabilities.

Column 2, third paragraph, change fourth and fifth sentence to: The time required for water migration through the pile is uncertain. Calculations indicate upwards of 1,360 years would be required for water to move down through a completed homogenous disposal pile. Initial flows will begin almost immediately upon pile construction at 9 gpm rate and escalate to 230 gpm as the surface area approaches 4,000 acres and the infiltrating water moves through the initial covering layers of the disposal pile.

Column 2, third paragraph, insert after sixth sentence: Thus, these time frames may further change based on commingling. The effects of commingling may be significant in the long term, because eventual differential compaction of somewhat cemented spent shale around competent blocks of overburden rock may cause cracking and fracturing, which will locally increase the permeability.

PAGE 47

Column 1, after first partial paragraph insert new paragraph: Locally the estimated travel times, both in the spent shale pile and in particular in the Uinta Formation, probably would be considerably shortened because of increased field permeability as a result of a heterogeneous shale pile and fractures in the Uinta Formation. Time of travel in the Uinta Formation could be less than a year.

PAGE 55

Figure II-23, scale should read 0 to 1/2 mile.

PAGE 57

Figure II-24, scale should read 0 to 1/2 mile.

PAGE 58

Figure II-25, scale should read 0 to 1/2 mile.

PAGE 61

Column 2, second paragraph, first sentence, delete after ". . . nahcolite and dawsonite."

Column 2, third paragraph, delete second sentence.

Column 2, fourth paragraph, delete second sentence.

PAGE 62

Column 1, delete first partial sentence.

PAGE 65

Column 2, second paragraph, delete sentences 6 and 7.

PAGE 68-71

Table II-6: See new reprint of table behind the Summary, FEIS.

CHAPTER III — AFFECTED ENVIRONMENT

PAGE 86

Figure III-7, see new figure.

PAGE 87

Column 1, second paragraph replace with: This disposal alternative overlies oil shales and sodium minerals of the Green River Formation. An average of 2,500,000 barrels of oil per acre or 10.0 billion barrels total is contained in the 4,000-acre area of the waste pile, in beds yielding an average of 8 gallons/ton or more. The average yield of the total thickness of resource is more than 20 gallons/ton. Approximately 100,000,000 tons of nahcolite and 80,000,000 tons of dawsonite per square mile underlie this alternative (Beard, Tait, and Smith 1974).

PAGE 112

Column 1, delete third paragraph.

Column 1, fifth paragraph, delete last sentence.

PAGE 119

Column 2, last paragraph change to: Historically, wildlife and livestock have been the principal users of these lands. They are still important today. Lands used for livestock grazing are used by the owners or are used in accordance with federal grazing permits or leases.

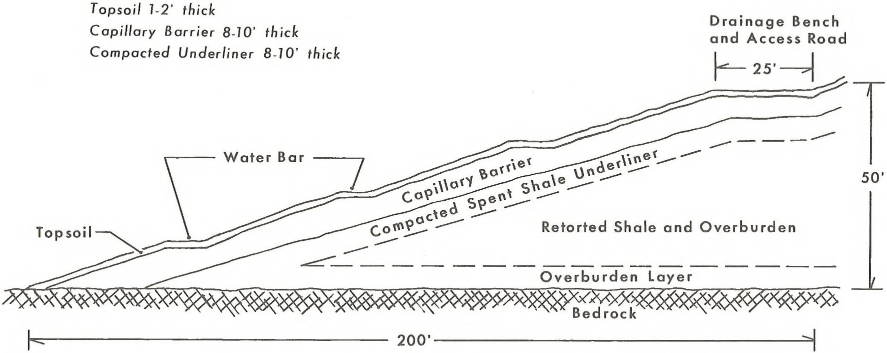
Topsoil 1-2' thick
Capillary Barrier 8-10' thick
Compacted Underliner 8-10' thick
Drainage Bench and Access Road
25'
Water Bar
Capillary Barrier
Compacted Spent Shale Underliner
50'
Topsoil
Retorted Shale and Overburden
Overburden Layer
Bedrock
200'

Figure II-16. Final Pile Slope Design (All Dimensions Approximate)

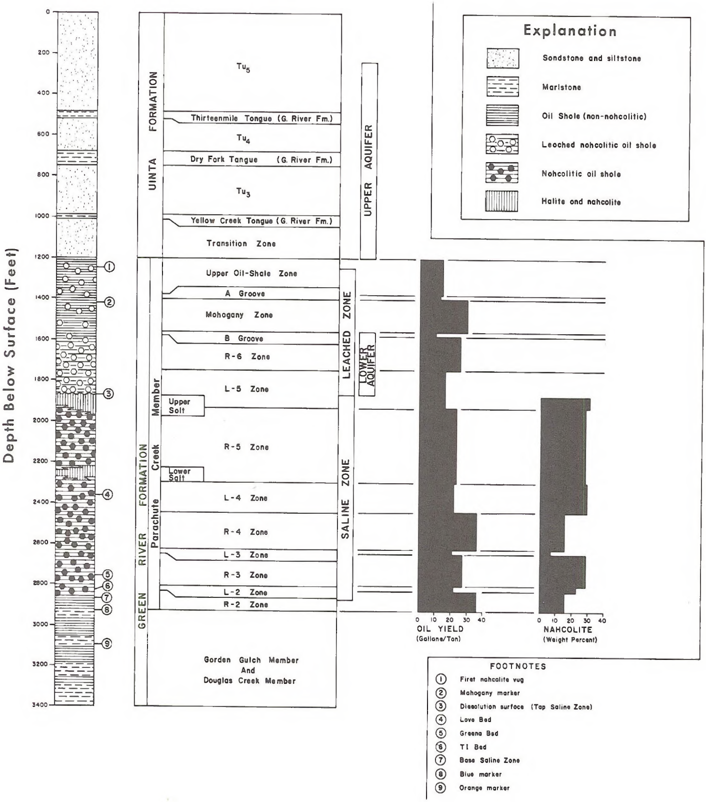

Figure III-7. Generic Stratigraphic Column of Uintah Formation and Upper Green River Formation (Multi Mineral Corporation 1981)

CHAPTER IV – ENVIRONMENTAL CONSEQUENCES

PAGE 190

Column 2, last paragraph, change last sentence to: Studies (Yuhnke and Oppenheimer 1984) have suggested a threshold criteria of 5 Kg/ha-yr of sulfur deposition; therefore, the worst case results of 1.03 Kg/ha-yr based on TAPAS modeling indicate that the project would result in depositional rates of about 21 percent of this value.

PAGE 191

Column 1, last paragraph, delete third sentence.

PAGE 197

Column 1, second paragraph, delete first sentence.

PAGE 199

Column 1, first partial sentence delete sentence after "... at this point."

PAGE 206

Column 2, under Surface Water Quantity delete first two paragraphs.

PAGE 207

Column 2, delete last paragraph.

PAGE 209

Column 1, delete first partial paragraph.

Column 1, delete fourth and fifth paragraph.

Column 2, delete third paragraph.

PAGE 210

Column 1, replace fourth paragraph with:

It is impossible to totally prevent infiltration and movement of the water within the pile. To achieve uniform compaction throughout the pile would extend the transit time of water marginally through the pile. Intensive compaction throughout the pile would accomplish nothing relative to infiltration control. Since the processed shale would be emplaced at a moisture content in excess of hydration and capillary needs, flow under gravity would be immediate from the bottom of the pile, having an initial flow rate of about 9 gpm (1 mm/yr). As the disposal pile grew in surface area this initial flow rate would increase to a steady-state condition of approximately 230 gpm, once the maximum sized pile configuration had been reached. Thus, this equilibrium condition may be achieved sometime during the project life, with flow out of the pile equaling net infiltration. A large degree of uncertainty exists about when equilibrium is reached. As the waste disposal pile increased in depth, the flow rates up to 230 gpm would remain relatively constant, based on an assumed net infiltration rate of 1 inch (25 mm) per year. The rate of leachate production as water moves through the disposal pile is very uncertain. Some leachate could move through the pile as quickly as 100 years, 200 years, 500 years, or as slowly as 1,300 years. There is much speculation on these time frames, but not whether it will occur. At some future date leachates from the spent shale disposal pile will exit the disposal piles and enter the underlying rock formations.

Column 2, delete first paragraph.

Column 2, second paragraph, change seventh sentence to: "...on the order of 100 to 1,000 years or more."

Column 2, second paragraph, eight sentence delete the word "much."

Column 2, fourth paragraph change to: "...water may take from 100 to 1,360 years..."

PAGE 211

Column 1, after first partial sentence insert: Initial flows are expected at 9 gpm due to drainage of the initial layer of spoils.

PAGE 214

Column 1, replace second paragraph with:

Approximately 70 meters (230 feet) of unsaturated Uinta sandstone underlie the 84 Mesa disposal pile. Transit time of the leachate is highly variable in this medium due to fractures, but it has been estimated to be 340 years (Brown 1984). However, locally, because of fractures, it could be as rapid as a few weeks. Thus, precipitation infiltrating the disposal pile would eventually reach the water table in the Uinta Formation under the disposal pile. How soon is unknown.

PAGE 216

Column 2, third paragraph, fifth sentence change to: "...84 Mesa site, however a comparable leachate transit time through the pile will be maintained."

Column 2, fourth paragraph, delete fourth sentence.

PAGE 218

Column 1, third paragraph, change last sentence to: Leachate transit time is uncertain, but may be similar to that suggested for the 84 Mesa Alternative. The thicker piles at the West Fork of Spring Creek site would increase the length of travel of leachate, but the greater potential infiltration rate at this site could cause a higher percentage of saturation and thus greater permeability and more rapid flow velocity (Figure II-20).

PAGE 219

Column 2, fourth paragraph, move the entire paragraph to the committed mitigation portion of the text under the subheading "Surface Water Quality."

PAGE 226

Column 1, first full paragraph, change first three sentences to: As a means of coordinating and directing wildlife-related mitigative/compensation activities, a Wildlife Mitigation Plan (WMP) would be incorporated, as currently specified in the Tract C-a lease environmental stipulations. The WMP would be developed at the time of the DDP by RBOSC, in consultation with BLM, USFWS, and CDOW. The objectives of the WMP would be to offset, to the extent practicable, short-term direct and indirect impacts to evaluation species, and in the long-term to compensate for project-induced habitat losses as agreed upon by the cooperating entities. The WMP would include strategies such as wildlife-oriented reclamation practices, habitat manipulation and enhancement, increased consideration for wildlife in BLM range management for livestock, and public education.

PAGE 227

Column 2, fourth paragraph, first sentence change to: ". . .84 Mesa site is not expected to impact the . . .whooping crane populations or their habitat as discussed. . ."

Column 2, fourth paragraph, second sentence change to: ". . .impacts to terrestrial threatened and endangered wildlife."

Column 2, change fifth paragraph to:

Regardless of alternative, the leasing and development of an offtract disposal area is not expected to affect listed fishes, although this analysis is preliminary, pending the results of Section 7 Consultation with the USFWS.

BLM recognizes that full development of a Tract C-a mine would involve groundwater use possibly augmented by water from the White River, and that such water depletion might affect occupied habitat of Colorado River squawfish and humpback chub. However, the rate, absolute volume, and longevity of water consumption would ultimately arise from the actual operating conditions of, and constraints imposed on, a C-a tract mine, which is beyond the scope of this EIS.

Full analysis of water-related impacts and successful completion of additional formal Section 7 Consultation with USFWS will be required before approval of the DDP, when pertinent water use information can be obtained to accurately assess potential impacts to listed fish populations and their habitat.

PAGE 228

Column 1, delete paragraphs one and two.

PAGE 232

Column 1, insert new paragraph at the end of Committed Mitigation:

Additional consultation with the USFWS, as mandated by Section 7 of the Endangered Species Act, will be required before approval of the DDP, when necessary water use information is available to accurately assess potential impacts to the Colorado River squawfish, humpback chub, or other applicable listed or proposed threatened and endangered species.

Column 2, first paragraph, change third sentence to: The No Action Alternative assumes that additional offtract acreage would not be incorporated for use as a disposal area; thus, habitat loss would be limited to the 5,090 acres encompassed by existing Tract C-a. Habitat loss figures associated with each disposal site option would be added to those 5,090 acres involved with Tract C-a development.

PAGE 234

Column 1, fifth paragraph, change first sentence to: The vegetative structure and composition that would be developed on the disposal pile would probably result in increased forage production, as compared to the present plant communities dominated by shrubs and pinyon-juniper trees.

PAGE 236

Column 1, fourth paragraph, change second sentence to: The vegetative structures and composition that would be developed on the disposal pile would probably result in increased forage production, as compared to the present plant communities dominated by shrubs and pinyon-juniper trees.

PAGE 237

Column 1, fifth paragraph, change first sentence to: The vegetative structures and composition that would be developed on the disposal pile would probably result in increased forage production, as compared to the present plant communities dominated by shrubs and pinyon-juniper trees.

PAGE 297-298

Net Energy Analysis, replace entire section with:

The requirements of NEPA and the Council on Environmental Quality (CEQ) regulations require that energy consumption and conservation must be addressed and considered in EISs. The energy analysis methodology, which developed in the early 1970s and which has become known as "net energy analysis," is an especially appropriate methodology to use in complying with CEQ guidelines.

Net energy analysis is a computation of both energy produced from the product and energy requirements to produce the product. Energy requirements include not only production needs, but also employee transportation and energy for ancillary employee support. Units of energy are converted to millions of British thermal units for comparison (1×10^6 Btu). The net energy ratio is a ratio of energy produced divided by the energy required for production.

For oil shale, in order to produce 1×10^6 Btu, it is required that 0.16×10^6 Btu be expended, not including the energy requirement for shale disposal.

Shale disposal at 84 Mesa will require an additional 0.01×10^6 Btu; Philadelphia Creek or Spring Creek will require an additional 0.02×10^6 Btu.

Net Energy Ratios

No Action Alternative — 1.00/0.16 = 6.25

84 Mesa Alternative — 1.00/0.17 = 5.88

Philadelphia or Spring Creek Alternative — 1.00/0.18 = 5.56

PAGE 303

Column 2, Proposed Action (84 Mesa) Alternative, change paragraph to: No federally-listed threatened or endangered plant species are likely to be directly affected by activities on the proposed 84 Mesa disposal site. However, candidate or sensitive plant species may exist within the proposed 84 Mesa disposal site.

Column 2, Area Common to Offtract Alternatives, change paragraph to: No federally-listed threatened or endangered plant species are likely to be directly affected by activities on the Area Common to Offtract Alternatives. However, candidate or sensitive plant species may exist within the Area Common to Offtract Alternatives.

PAGE 304

Column 2, First complete paragraph, change first sentence to: Site-specific field surveys for threatened, endangered, candidate, and sensitive plant species would be required for all alternative disposal areas and the right-of-way corridor as a part of the preparation of the detailed development plan.

PAGE 312

Column 1, third paragraph, change second and third sentence to: A steady state flow rate approaching 230 gpm may be reached at an undetermined future date (less than 100 years or longer than 1,000 years) from the base of the disposal pile. It could take from several to 340 years before the leachates would enter the upper aquifer.

CHAPTER V — LIST OF PREPARERS

ADDITIONS

In addition to those persons listed in Chapter V as contributors to the draft EIS, the following persons contributed to the final EIS for the C-a Offtract Lease.

GLEN A. MILLER

Job Title: Hydrologist; Hydrology Review

Education: B.A., 1951; M.S., 1952, Geology, University of Tennessee, Knoxville, Tennessee

Experience: Geology and Hydrology, USGS, 20 years; Oil Shale Hydrology, USGS, 7 years; Oil Shale Hydrology, MMS, 1 year; Oil Shale Hydrology, BLM, 3 years

JOHN E. FEND

Job Title: EIS Coordinator; Team Leader (FEIS)

Education: B.S., 1977, Wildlife Biology/Management, Humboldt State University, Arcata, California.

Experience: Range Conservationist, BLM, 8 years

DAVID D. HARNED

Job Title: Chief, Branch of Technical Support and Assistance; Net Energy Analysis

Education: B.S., 1959, General Engineering, University of Wyoming, Laramie, Wyoming

Experience: Civil Engineer, BLM, 12 years; Access Specialist, BLM, 3 years; Branch Chief, BLM, 5 years

DELETIONS

The following two individuals names have been withdrawn as participants in the preparation of the DEIS: Randy Heuscher and Don Johnson.

CHANGES

The descriptions for the following two individuals was incomplete and has been updated as follows:

STAN P. SMEREY

Job Title: Supervisor Drafting and Reproduction; Graphics

Experience: Amoco Production Company, 22 years; Rio Blanco Oil Shale Company, 8 years

JOHN MILEY

Job Title: Senior Mining Engineer; Solid Minerals

Education: E.M., 1951, Mining, Colorado School of Mines, Golden, Colorado

Experience: Mine Engineer, Miner, Shift Boss, Mine Foreman, Telluride Mines Inc., Treasure Tunnel, Homestake, Benquet Consolidated, 16 years; Mining Engineer, Bureau of Mines, MSHA, 10 years; Mining Engineer, DOE, 3 years; Mining Engineer, USGS/MMS/BLM, 5 years

ERRATA

PAGE 56

Column 1, sixth paragraph, second sentence: "133" should read "1,331."

PAGE 86

Figure III-7: "Detailed Stratigraphic. . ." should read "Generic Stratigraphic. . ."

PAGE 87

Column 1, fourth paragraph, third sentence: "75,000,000" should read "100,000,000" and "60,000,000" should read "80,000,000."

PAGE 127

Column 2, first paragraph, second sentence: "84 Mesa Alternative" should read "Area Common to Offtract Alternatives."

PAGE 144

Column 1, first full paragraph, third sentence: "$6.62 per day" should read "$56.62 per day."

PAGE 190

Column 2, first full sentence: "Most of these..." should read "Both of these..."

PAGE 200

Table IV-10, 84 Mesa, In-Place (row), Nahcolite (column): "470.0" should read "625."

Table IV-10, 84 Mesa, In-Place (row), Dawsonite (column): "375.0" should read "500."

Table IV-10, 84 Mesa, Recoverable (row), Nahcolite (column): "263.0" should read "350."

Table IV-10, 84 Mesa, Recoverable (row), Dawsonite (column): "210.0" should read "280."

Table IV-10 insert: Footnote: Resources of 84 Mesa are contained in the 4,000-acre area of the waste pile.

Column 1, third paragraph, first sentence: ". . .117.3 million tons of nahcolite and 94.0 million tons of dawsonite." should read ". . .156.0 million tons of nahcolite and 125.0 million tons of dawsonite."

Column 2, first full sentence: ". . .263.0 million tons of nahcolite, and 210.0 million tons of dawsonite. . ." should read ". . .350 million tons of nahcolite, and 280 million tons of dawsonite. . ."

PAGE 202

Table IV-12, 84 Mesa, With Waste Pile (row), Nahcolite Recovery (column): "112.6" should read "150.5."

Table IV-12, 84 Mesa, With Waste Pile (row), Nahcolite Foregone (column): "150.4" should read "199.5."

Table IV-12, 84 Mesa, With Waste Pile (row), Dawsonite Recovery (column): "90.0" should read "120.4."

Table IV-12, 84 Mesa, With Waste Pile (row), Dawsonite Foregone (column): "120.0" should read "159.6."

Table IV-12, 84 Mesa, Without Waste Pile (row), Nahcolite Recovery (column): "117.3" should read "156."

Table IV-12, 84 Mesa, Without Waste Pile (row), Nahcolite Foregone (column): "145.7" should read "194."

Table IV-12, 84 Mesa, Without Waste Pile (row), Dawsonite Recovery (column): "94.0" should read "125."

Table IV-12, 84 Mesa, Without Waste Pile (row), Dawsonite Foregone (column): "116.0" should read "155."

Table IV-12, 84 Mesa, Open Pit Mining (row), Nahcolite Recovery (column): "263.0" should read "350."

Table IV-12, 84 Mesa, Open Pit Mining (row), Dawsonite Recovery (column): "210.0" should read "280."

PAGE 203

Column 1, first paragraph, last sentence delete: "Due to. . .the region."

PAGE 204

Column 2, third paragraph, first sentence: ". . .4.7 million tons of nahcolite, and 4.0 million tons of dawsonite. . ." should read ". . .5.5 million tons of nahcolite, and 4.6 million tons of dawsonite. . ."

PAGE 216

Column 2, third paragraph, seventh sentence: ". . .altered and increased. . ." should read ". . .altered and decreased. . ."

PAGE 232

Column 2, first paragraph, first sentence: ". . .of the project,. . ." should read ". . .of the offtract disposal project,. . ."

Column 2, first paragraph, second sentence: "This would include. . ." should read "This would involve. . ."

PAGE 243

Column 1, last paragraph, first sentence: "Approximately 1,630 acres. . ." should read "Approximately 3,440 acres. . ."

Column 2, seventh paragraph, first sentence: "Approximately 3,678 acres. . ." should read "Approximately 5,488 acres. . ."

PAGE 244

Column 1, third paragraph, first sentence: "Approximately 1,006 acres. . ." should read "Approximately 2,816 acres. . ."

PAGE 299

Figure IV-14: Delete.

PAGE 300

Figure IV-15: Delete.

PAGE 350

Column 2, Secondary Impacts: Should read "An impact that can be directly attributable to the Proposed Action, that results in impacts to off-lease lands; for example, the relocation of roads, pipelines, fences, etc. that are necessary because the disposal pile would cover them. This relocation is the secondary impact."

PAGE 351

Column 2, Total Suspended Particulates: ". . .30 microns in diameter." should read ". . .50 microns in diameter."

REFERENCES

Add the following reference:

Yuhnke and Oppenheimer. 1984. The 1982 Stockholm Conference on Acidification of the Environment, and Acidification Today and Tomorrow. Swedish Ministry of Agriculture 1982.

APPENDICES

5-1-74
3 [illegible]
jmc

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

OIL SHALE LEASE

Serial No.: C-20046

Tract C-a

Consisting of Pages 1 through 52, A-1 through A-19, A-19a, and A-20 through A-38, inclusive.

FEB 6 '74

ORIGINAL

County of Denver) ss
State of Colorado)

I certify that the attached is a true copy of the original oil shale lease issued under serial number Colorado 20046, Tract C-a.

Dated: August 31, 1977

Jerry L Saunders
Notary Public residing at
8340 Auburn Lane
Westminster, Colorado 80030

My commission expires May 10, 1978.

C-20046

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

OIL SHALE LEASE

SECTION 1 - Definitions

SECTION 2 - Grant to Lessee

SECTION 3 - Lessor's reserved interests in the Leased Lands

SECTION 4 - Lease Term

SECTION 5 - Bonus

SECTION 6 - Rentals

SECTION 7 - Royalties

SECTION 8 - Payments

SECTION 9 - Bond

SECTION 10 - Development plan and diligence requirements

SECTION 11 - Protection of the environment; additional stipulations

SECTION 12 - Operations on the Leased Lands; Water Rights

SECTION 13 - Development by in situ method

SECTION 14 - Nuclear fracturing

SECTION 15 - Inspection and investigation

SECTION 16 - Reports, maps, etc.

SECTION 17 - Notice

SECTION 18 - Employment practices

SECTION 19 - Equal Opportunity Clause; certification of non-segregated facilities

SECTION 20 - Taxes

SECTION 21 - Monopoly and fair prices

SECTION 22 - Suspension of operations or production

SECTION 23 - Readjustment of terms and conditions

SECTION 24 - Assignment

SECTION 25 - Overriding royalties

SECTION 26 - Heirs and successors in interest

SECTION 27 - Unlawful interest

SECTION 28 - Relinquishment of lease

SECTION 29 - Remedies in case of default

SECTION 30 - Effect of waiver

SECTION 31 - Delivery of premises in case of forfeiture

SECTION 32 - Disposition of property upon termination of lease

SECTION 33 - Protection of proprietary information

SECTION 34 - Lessee's liability to the Lessor

SECTION 35 - Appeals

SECTION 36 - Interpretation of this lease

OIL SHALE LEASE ENVIRONMENTAL STIPULATIONS

SECTION 1 - GENERAL

(A) Applicability of Stipulations

- (B) Changes in Conditions
- (C) Collection of Environmental Data and Monitoring Program
- (D) Emergency Decisions
- (E) Environmental Briefing
- (F) Construction Standards
- (G) Housing and Welfare of Employees
- (H) Posting of Stipulations and Plans

SECTION 2 - ACCESS AND SERVICE PLANS

- (A) Transportation Corridor Plans
- (B) Regulation of Public Access
- (C) Existing and Planned Roads and Trails
- (D) Waterbars and Breaks
- (E) Pipeline Construction Standards
- (F) Pipeline Safety Standards
- (G) Shut-off Valves
- (H) Pipeline Corrosion
- (I) Electric Transmission Facilities
- (J) Natural Barriers
- (K) Specifications for Fences and Cattleguards
- (L) Crossings
- (M) Alternate Routes
- (N) Off-Road Vehicle Use

SECTION 3 - FIRE PREVENTION AND CONTROL

- (A) Instructions of the Mining Supervisor

- (B) Liability of Lessee

SECTION 4 - FISH AND WILDLIFE

- (A) Management Plan
- (B) Mitigation of Damage
- (C) Big Game
- (D) Posting of Notices

SECTION 5 - HEALTH AND SAFETY

- (A) In General
- (B) Compliance with Federal Health and Safety Laws and Regulations
- (C) Use of Explosives

SECTION 6 - HISTORIC AND SCIENTIFIC VALUES

- (A) Cultural Investigations
- (B) Objects of Historic or Scientific Interest

SECTION 7 - OIL AND HAZARDOUS MATERIALS

- (A) Spill Contingency Plans
- (B) Responsibility
- (C) Reporting of Spills and Discharges
- (D) Storage and Handling
- (E) Pesticides and Herbicides

SECTION 8 - POLLUTION--AIR

- (A) Air Quality
- (B) Dust
- (C) Burning

SECTION 9 - POLLUTION--WATER
  (A) Water Quality
  (B) Disturbance of Existing Waters
  (C) Control of Waste Waters
  (D) Cuts and Fills
  (E) Crossings
  (F) Road Surfacing Material
SECTION 10 - POLLUTION--NOISE
SECTION 11 - REHABILITATION
  (A) In General
  (B) Management Plan
  (C) Stabilization of Disturbed Areas
  (D) Surface Disturbance on Site
  (E) Areas of Unstable Soils
  (F) Materials
  (G) Slopes of Cut and Fill Areas
  (H) Impoundments
  (I) Flood Plains
  (J) Land Reclamation
  (K) Overburden
  (L) Revegetation
SECTION 12 - SCENIC VALUES
  (A) Scenic Considerations in General
  (B) Consideration of Aesthetic Values
  (C) Protection of Landscape

  (D) Signs
SECTION 13 - VEGETATION
  (A) In General
  (B) Timber
  (C) Clearing and Stripping
SECTION 14 - WASTE DISPOSAL
  (A) Mine Waste
  (B) Other Disposal Areas
  (C) Disposal of Solid and Liquid Wastes
  (D) Impoundment of Water
  (E) Slurry Waste Disposal

C-20046

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

OIL SHALE LEASE

In consideration of the mutual promises, terms and conditions contained herein, and the grant made hereby, this lease is entered into on FEB 5 , 1974, to be effective on MAR 1 , 1974, (hereinafter called the "Effective Date"), by the United States of America (hereinafter called the "Lessor"), acting through the Bureau of Land Management (hereinafter called the "Bureau"), of the Department of the Interior (hereinafter called the "Department"), and STANDARD OIL COMPANY (INDIANA), P. O. Box 5910-A, Chicago, Illinois 60680 and GULF OIL CORPORATION, 1780 South Bellaire Street, Denver, Colorado 80222, (hereinafter called the "Lessee"), pursuant and subject to the terms and provisions of the Mineral Leasing Act of February 25, 1920 (41 Stat. 437) as amended (30 U.SC. ss181-263) (hereinafter called the "Act"), and to the terms, conditions, and requirements (1) of all regulations promulgated by the Secretary of the Interior (hereinafter called the "Secretary") in existence upon the Effective Date, specifically including, but not limited to, the regulations in 30 CFR Part 231 and 43 CFR Part 23 and Group 3000, all of which are incorporated herein and, by reference, made a part hereof; and (2) of all regulations hereafter promulgated by the Secretary (except those inconsistent with any specific provisions of this lease other than regulations incorporated herein by reference), all of which shall be, upon their effective date, incorporated in and, by reference, made a part of this lease.

Section 1. Definitions

As used in this lease:

(a) "Oil Shale" means a fine-grained sedimentary rock containing: (1) organic matter which was derived chiefly from aquatic organisms or waxy spores or pollen grains, which is only slightly soluble in ordinary petroleum solvents, and of which a large proportion is distillable into synthetic petroleum, and (2) inorganic matter which may contain other minerals. This term is applicable to any argillaceous, carbonate, or siliceous sedimentary rock which, through destructive distillation will yield synthetic petroleum. The products of Oil Shale include both shale oil and other minerals;

(b) "Leased Lands" means

T. 1 S., R. 99 W., 6th P.M.
Sec. 32: E½, E½W½
Sec. 33: All
Sec. 34: W½, SE¼, W½NE¼, SE¼NE¼
T. 2 S., R. 99 W., 6th P.M.
Sec. 3: All
Sec. 4: All
Sec. 5: E½, E½W½ (incl. Lots 1, 2, and 3)
Sec. 8: E½
Sec. 9: All
Sec. 10: All

situated in the County of Rio Blanco, State of Colorado containing 5,089.70 acres, more or less;

(c) "Leased Deposits" means all deposits of Oil Shale lying within or under the Leased Lands;

(d) "Anniversary Date" means the anniversary of the Effective Date of this lease; however, if operations under this lease are suspended pursuant to section 39 of the Act (30 U.S.C. ss209), the next Anniversary Date of this lease after the suspension shall follow the previous Anniversary Date by a period of time equal to the sum of one year and the period of suspension, and subsequent Anniversary Dates will be measured from that Anniversary Date;

(e) "Lease Year" means the period of time between two successive Anniversary Dates of this lease;

(f) "Ton" means a measures of weight of 2,000 pounds avoirdupois;

(g) "Mining Supervisor" means the appropriate mining supervisor of the United States Geological Survey (hereinafter called the "Geological Survey"), as defined in 30 CFR 231.2(c); and

(h) "Commercial Quantities" means quantities sufficient to provide a return after all variable costs of production have been met.

Section 2. Grant to Lessee

The Lessee is hereby granted, subject to the terms of this lease, the exclusive right and privilege to

prospect for, mine by underground or surface means and process by retorting or by in situ methods or otherwise, as he may reasonably choose and in accordance with approved plans, utilize, and dispose of all Leased Deposits together with the right to construct on the Leased Lands all such works, buildings, plants, structures, roads, powerlines, and additional facilities as may be necessary or reasonably convenient for the mining, processing, and preparation of products of the Lease Deposits for market and the housing and welfare of the Lessee's employees, agents, and contractors, and to use so much of the surface of the Leased Lands as may reasonably be required in the exercise of the rights and privileges herein granted.

Section 3. Lessor's reserved interests in the Leased Lands

The Lessor reserves the following:

(a) The right to lease, sell, or otherwise dispose of the surface of the Leased Lands or of any surface or mineral resource in the Leased Lands (or of any interest therein) under existing laws and laws hereafter enacted, subject to the rights of the Lessee under this lease;

(b) The right, upon such terms as it may determine to be just, to permit for joint or several use, such easements or rights-of-way, including easements in tunnels upon, through, or in the Leased Lands, as may be necessary or appropriate to the working of the Leased Lands or other lands containing mineral deposits subject to the Act, and the treatment and shipment of the products thereof by or under authority of the Lessor, its Lessees, or permittees, and for other public purposes; and

(c) The right to conduct and to authorize geological and other investigations on the Leased Lands which do not interfere with or endanger operations under this lease.

Section 4. Lease Term

This lease shall be for a period of 20 Lease Years from the Effective Date and so long thereafter as there is production from the Leased Deposits in commercial quantities, subject to the provisions of section 23 with respect to the readjustment of terms and conditions and the right of the parties to terminate the lease.

Section 5. Bonus

In addition to all other payments required hereunder, the Lessee shall pay to the Lessor the amount $210,305,600 as a bonus. This bonus shall be due and payable in five installments as follows: Receipt of $42,061,120 at the time of the sale as the first installment

is hereby acknowledged by the Lessor; the balance shall be paid in four equal annual installments of $42,061,120 due and payable on each of the first four Anniversary Dates of this lease. In the event the Secretary accepts a surrender or relinquishment of this lease filed by the Lessee at any time prior to the third Anniversary Date, the Lessee shall be released from any obligation to pay the fourth and fifth bonus installments required hereunder. That release shall not relieve the Lessee of the obligation to pay installments which had accrued prior to the filling of the surrender or relinquishment of the lease, but had not been paid prior to the Secretary's acceptance of that surrender or relinquishment. The Lessee may credit against the fourth bonus installment any expenditures prior to the third Anniversary Date directly attributable to operations under this lease on the Leased Lands for the development of the Leased Deposits, but not any expenditures attributable to the preparation of a development plan under section 10 of this lease. Upon the credit of an expenditure, the Lessee shall be relieved of the duty of paying the equivalent amount of the fourth bonus installment. Similarly, the Lessee may credit against the fifth bonus installment any expenditures prior to the fourth Anniversary Date directly attributable to operations under this lease on the Leased Lands for the development of the Leased Deposits and not credited against the fourth bonus installment, but not any expenditures attributable to the preparation of a development plan under section 10. Upon the credit of an expenditure, the Lessee shall be relieved of the duty of paying the equivalent amount of the fifth bonus installment. The Mining Supervisor shall have the duty of determining whether expenditures credited by the Lessee are properly attributable to such operations, and, if the Mining Supervisor determines that any reported expenditure is not attributable to such operations, the Lessee shall not receive credit for that expenditure.

Section 6. Rentals

The Lessee shall pay the Lessor an annual rental which shall be in the amount of 50 cents for each acre or fraction of an acre of the Leased Lands. The Lessee shall pay the rental for each subsequent Lease Year on or before the first day of that Lease Year. Rentals for any Lease Year shall be credited by the Lessor against any royalty payments for the Lease Year.

Section 7. Royalties

(a) The lessee shall pay to the Lessor a

royalty on all Oil Shale extracted by the Lessee from the Leased Lands which is either processed or sold by the Lessee. The royalty on Oil Shale shall be computed separately for shale oil and for other minerals as follows:

(1) The royalty on shale oil shall be computed on the basis of the shale oil content of the Oil Shale; the method of computing the royalty shall depend upon whether the Oil Shale is extracted by mining methods or processed by in situ methods.

(i) If the Oil Shale is extracted by mining methods, the Lessee shall pay the Lessor a basic royalty rate of 12 cents on every Ton of Oil Shale which the Lessee either processes under this Lease either on or off the Leased Lands or sells prior to processing. This basic royalty rate shall be subject to the following adjustments:

(A) If the shale oil content of the Oil Shale mined is less than 30 gallons per Ton, the basic royalty rate per Ton of Oil Shale shall be reduced by one cent for each gallon or fraction thereof that the shale oil content is less than 30 gallons per Ton, but in no event shall the royalty rate be less than four cents per Ton. If the shale oil content of the Oil Shale mined is more than 30 gallons per Ton, the basic royalty rate per Ton shall be increased by one cent for each gallon or fraction thereof that the shale oil content is more than 30 gallons per Ton.

(B) For the calendar year in which the Effective Date occurs and for each calendar year thereafter, the Secretary shall determine the combined average value per barrel of all crude oil and crude shale oil produced in the States of Colorado, Utah, and Wyoming. The basic royalty rate applicable to the second and each succeeding Lease Year shall be adjusted by an increase or decrease of the same percentage as the percentage of increase or decrease in the combined average value for the calendar year during which that Lease Year begins as compared with the combined average value for the calendar year during which the previous Lease Year began. However, in no event shall the basic royalty rate for shale oil be decreased to less than 4 cents on every Ton of Oil Shale mined under the lease.

(C) The shale oil content of the Oil Shale shall be determined either by the Modified Fisher Assay method or by such other method as the Lessor and the Lessee adopt, and the royalty shall be based on the monthly average of shale oil content of all Oil Shale processed under this lease or transferred from the Leased Lands for processing or sale by the Lessee.

Computations of quantities, assays and royalties shall be rounded to the nearest hundredth, or within the limits of the standard deviation for commercial testing equipment as approved by the Mining Supervisor.

(ii) (A) If the Oil Shale is processed by in situ methods, royalty shall be paid at a basic royalty rate of 12 cents per Ton. The number of Tons processed shall, for purposes of computing royalty, be determined by: (I) establishing through calorimetric tests designated by the American Society for Testing and Materials as "Standard" or "Tentative," the total gross heat of combustion in BTUs of all oil and gas products at the well head, adjusted downward by the total gross heat of combustion in BTUs of combustible fluids (gases or liquids) injected as heat carriers, but not for fuel purposes, into the formation being processed; (11) dividing the adjusted total gross heat of combustion in BTUs by 152,700 BTUs (shale oil and gas recovered by Modified Fischer Assay of Oil Shales, containing approximately 30 gallons of shale oil per Ton, has a heating value of 152,700 BTUs per gallon of shale oil and associated gas), to arrive at the equivalent number of gallons of shale oil produced; and (111) dividing the equivalent number of gallons of shale oil produced by 30, to arrive at the number to Tons of Oil Shale processed by in situ methods.

(B) The basic royalty rate applicable to shale oil from Oil Shale process by in situ methods shall be adjusted in the same manner as that provided in paragraph (a)(1)(i)(B) of this section for the adjustment of the basic royalty rate applicable to shale oil processed from Oil Shale extracted by mining methods.

(C) Computations of quantities, assays and royalties relating to tonnage of Oil Shale shall be determined by the same standards as used under Section 7 (a)(1)(i)(C).

(2) The Lessee shall also pay a royalty on all minerals other than shale oil contained in Oil Shale produced from the Leased Deposits which the Lessee processes, either on or off the Leased Lands, or sells. This royalty shall be computed on the basis of the gross value of the other minerals at the point of shipment to market, and shall be at s rate of 3 per centum for the first ten Lease Years, 4 per centum for the eleventh year through the fifteenth Lease Year, and 5 per centum beginning with the sixteenth Lease Year.

(b) The Lessee shall determine accurately, on the Leased Lands, the weight or quantity and quality of all Oil Shale produced from the Leased Deposits by each method used and shall enter the weight or quantity and quality thereof accurately in books which shall be kept and preserved by the Lessee for such purposes.

(c) Payments for royalties due under this lease shall be payable monthly on or before the last day of the calendar month following the calendar month in which the Oil Shale is processed or, if it is not processed, is sold.

(d) If the Lessee shall show the compliance with the requirements for environmental protection prescribed in the detailed development plan (or amended, supplemental, or partial plan) required under section 10 of this lease, and as approved in accordance with the regulations in 43 CFR Part 23 and 30 CFR Part 231, now or hereinafter in force, or imposed by legislation enacted after the effective date of that plan (or of sn amendment or supplement to that plan), has engendered or will engender extraordinary costs in an amount which is in excess of those in the contemplation of the parties, as determined by the Lessor, on the effective date of that plan (or amendment or supplement to that plan).

the Secretary, if he deems it desirable, may, in order to offset such costs, adjust the royalties that would otherwise become due and payable thereafter under subsection (a) of this section by allowing a credit against those royalties in such an amount, and for such a time as he determines is warranted in the circumstances.

(c) (1) For the sixth and each succeeding Lease Year the Lessee shall pay a minimum royalty which, to the extent that royalties on production during the Lease Year in that amount have not been previously paid, shall be due and payable on the Anniversary Date at the end of that Lease Year. For the sixth Lease Year, the Lessee's minimum royalty shall be equal to the royalty due on shale oil under subsection (a)(1)(i) of this section on an annual production rate of 1,130,000 Tons of Oil Shale containing 30 gallons of shale oil per Ton of Oil Shale. The annual production rate for computing minimum royalty for each subsequent Lease Year up to and including the fifteenth Lease Year shall increase in an amount of 1,130,000 Tons of Oil Shale per year for each subsequent Lease Year; for the fifteenth and each subsequent Lease Year the annual rate shall be 11,300,000 Tons of Oil Shale. The Secretary may excuse the Lessee from compliance, in whole or in part, with the requirements of this paragraph (1) of subsection (e) during any year in which the Lessee is prevented by circumstances over which he has no control from implementing a development plan submitted under Section 10 of this lease.

(2) The Lessee may credit against any minimum royalty due on the sixth Anniversary Date or any subsequent Anniversary Date up to and including the tenth Anniversary Date the amount of any expenditures which are made between the approval of the development plan under Section 10 of this lease and the tenth Anniversary Date and which are directly attributable to operations on the Leased Lands pursuant to that development plan for the development of the Leased Deposits and which were not credited against the fourth and fifth bonus installments. The Mining Supervisor shall have the duty of determining whether expenditures credited by the Lessee are attributable to such operations, and, if the Mining Supervisor determines that any reported expenditure is not attributable to such operations, the Lessee shall not receive credit for the expenditure. Upon the credit of an expenditure against the minimum royalty due, the Lessee will be relieved of the duty of paying the equivalent amount of minimum royalty: *Provided*, *however*, that, if there is actual production in the sixth or any subsequent Lease Year, the Lessee shall not be permitted to credit expenditures against the first $10,000 of minimum royalty due for that Lease Year.

(f) If the Lessee enters into production prior to the eighth Anniversary Date, and the royalty due in the eighth or any previous Lease Year exceeds the minimum royalty due under subsection (e)(1) of this section for that Lease Year, the Lessee shall be relieved from the payment of one-half of the difference between the actual royalty due for that Lease Year and the figures set in subsection (c)(1) for minimum royalty due for that Lease Year. This relief from the payment of royalty shall be in addition to any crediting of expenditures under subsection (e)(2) of this section, but no crediting of expenditures against minimum royalty shall reduce the figure for minimum royalty used in the preceding sentence.

Section 8. Payments

All bonus installments shall be paid to the appropriate State Office of the Bureau. All rental payments shall be made to the appropriate State Office of the Bureau until this lease enters a producing status or minimum royalty is required to be paid on it; thereafter the rentals and royalties shall be paid to the appropriate Mining Supervisor with whom all reports (including any reports on expenditures deductible under section 5) concerning operations under the lease shall be filed. All remittances to the Bureau shall be made payable to the Bureau of Land Management; those to the Geological Survey shall be made payable to the United States Geological Survey.

Section. Bond

(a) The Lessee shall file with the appropriate Bureau office and maintain a bond in the amount of $20,000 for the purpose of ensuring compliance with the provisions of this lease, except those provisions for compliance with which a separate bond is required under subsection (b) of this section.

(b) (1) Upon approval of a detailed development plan under section 10 of this lease, the Lessee shall file with the appropriate Bureau office and maintain, in addition to the bond required under subsection (a) of this section, a bond (in an amount determined pursuant to paragraph (2) of this subsection) which shall be conditioned upon the faithful compliance with the regulations in 30 CFR Part 231 and 43 CFR Part 23, the provisions of sections 10 and 11 of this lease, the Oil Shale Lease Environmental Stipulations attached to this lease pursuant to section 11, and any approved development plan (or approved, amended, supplemental or partial plan), to the extent that it relates to the preservation and protection and conservation of resources other than Oil Shale during the conduct of exploration or mining operations, and the reclamation of lands and waters affected by exploration or mining operations.

(2) During the first three Lease Years after the approval of a detailed development plan under section10 of this lease, the bond shall be in an amount equal to (i) $2,000 per acre for all portions of the Leased Lands which, pursuant to the plan, will be used for spent shale disposal sites and sites for actual mining operations during that three year period and (ii) $500 per acre for all other portions of the Leased Lands upon which operations will be conducted or which will be directly affected by operations during that three year period under the plan, but the total bond shall in no event be less than $20,000. After the first three Lease Years the bond shall be renewed at intervals of thee Lease Years. Each renewed bond shall be for three Lease Years and at such a total figure as shall be determined by the Lessor to be needed to provide for the reclamation and restoration of all portions of the Leased Lands which have been affected by previous operations under this lease or which will be affected by operations under this lease during the ensuing three year period. The amount of the bond shall be increased at any time during the three-year period at the demand of the Lessor if there is a change in the development plan which, in the opinion of the Lessor, increases the possibility of environmental damage. Upon request of the Lessee, the bond may be released as to all or any portion of the Leased Lands affected by exploration or mining operations during the three year period covered by the bond when the Lessor has determined that the Lessee has successfully met the reclamation requirements of the approved development plan and that operations have been carried out and completed with respect to these lands in accordance with the approved plan.

(c) Prior to the approval of any plan for exploratory work under section 10(d) of this lease, the Lessee shall file with the appropriate Bureau office and maintain, in addition to the bond required under subsection (a) of this section, a bond in such an amount as the Mining Supervisor shall require, but in no event less than $20,000, which shall be conditioned upon the faithful compliance with regulations in 30 CFR Part 231 and 43 CFR Part 23, the provisions of sections 10 and 11 of this lease, the Oil Shale Lease Environmental Stipulations attached to this lease pursuant to section 11, and any approved plan for exploratory work, to the extent that it relates to the preservation and protection of the environment (including land, water, and air), the protection and conservation of resources other than Oil Shale during the conduct of exploration operations, and the reclamation of lands and waters affected by exploration operations.

The bond required by this subsection shall apply only to actions taken prior to the date of approval of the development plan under section 19(a) of this lease. However, with the consent of the Mining Supervisor, the Lessee may modify this bond in such a manner as is necessary to meet the requirements of subsection (b) of this section, and the bond so modified may, with the consent of the Mining Supervisor, be maintained as the bond required under subsection (b).

Section 10. Development plan and diligence requirements

(a) The Lessee shall file with the Mining Supervisor on or before the third Anniversary Date a detailed development plan. This plan shall include: (1) a schedule of the planning, exploratory, development, production, processing, and reclamation operations and all other activities to be conducted under this lease; (2) a detailed description pursuant to 30 CFR Part 231 and 43 CFR Part 23 of the procedures to be followed to assure that the development plan, and lease operations thereunder, will meet and conform to the environmental criteria and controls incorporated in the lease; and (3) a requirement that the Lessee use all due diligence in the orderly development of the Leased Deposits, and, in particular, to attain, at as early a time as is consistent with compliance with all the provisions of this lease, production at a rate at least equal to the rate on which minimum royalty is computed under section 7(c)(1).

Prior to commencing any of the operations under the development plan in the Leased Lands, the Lessee shall obtain the Mining Supervisor's approval of the development plan. The Mining Supervisor shall not delay unnecessarily in the consideration of a development plan, but he shall take time to consider both technical and environmental provisions of the plan thoroughly prior to approval, and shall hold public hearings on the environmental provisions to assist him in his consideration of the detailed development plan. If the development plan submitted by the Lessee is unacceptable, the Mining Supervisor shall inform the Lessee by written notice of the reasons why the development plan is unacceptable and shall give him an opportunity to amend the plan. If an acceptable development plan is not submitted to the Mining Supervisor by the Lessee within one year after the Lessee's receipt of that notice, the Mining Supervisor shall send a second written notice to the Lessee concerning the unacceptability of the development plan. A failure by the Lessee to submit an acceptable plan within one year after his receipt of the second written notice, without reasonable justification for delay, shall be grounds for termination of the lease, if the Lessor so elects.

Upon approval of the plan, the Lessee shall proceed to develop the Leased Deposits in accordance with the approved plan. After the date of approval of the development plan, the Lessee shall conduct no activities upon the Leased Lands except pursuant to the development plan, or except for necessary activities following a relinquishment under section 28 of this lease or for the disposition of property after termination pursuant to section 32 of this lease.

(b) The Lessee must obtain the written approval of the Mining Supervisor of any change in the plan approved under subsection (a).

(c) The Lessee shall file with the Mining Supervisor annual progress reports describing the operations conducted under the development plan required under subsection (a).

(d) Prior to undertaking any exploratory work on the Leased Lands between the Effective Date and the date of approval of the detailed development plan required by subsection (a) of this section, the Lessee shall file with the Mining Supervisor a plan showing the exploratory work which he proposes to undertake and he shall not commence that work until the Mining Supervisor has approved the plan.

Exploratory work, as used in this subsection, shall include, but not be limited to, seismic work, drilling, blasting, research operations, cross-country travel, the construction of roads and trails and other necessary facilities, and the accumulation of baseline data required under section 1(C) of the Oil Shale Lease Environmental Stipulations. Prior to approval of the detailed development plan under subsection (a) of this section, all exploratory work on the Leased Lands shall be conducted pursuant to a plan approved under this subsection.

Section 11. Protection of the environment; additional stipulations

(a) The Lessee shall conduct all operations under this lease in compliance with all applicable Federal, State and local water pollution control, water quality, air pollution control, air quality, noise control, and land reclamation statues, regulations, and standards.

(b) The Lessee shall avoid, or, where avoidance is impracticable, minimize and, where practicable, repair damage to the environment, including the land, the water and air.

(c) The Oil Shale Lease Environmental Stipulations are attached to and specifically incorporated in this lease. A breach of any terms of these stipulations will be a breach of the terms of this lease and subject to all the provision of this lease with respect to remedies in case of default.

Section 12. Operations on the Leased Lands; Water Rights

(a) The Lessee shall exercise reasonable diligence, skill, and care in all operations on the Leased Lands The Lessee's obligations shall include, but not be limited to, the following:

(1) The Lessee shall conduct all operations on the Leased Lands so as to prevent injury to life, health, or property.

(2) The Lessee shall avoid, or, where avoidance is impracticable, minimize and, where practicable, correct hazards to the public health and safety related to his operations on the Leased Lands.

(3) The Lessee shall avoid wasting the mineral deposits, and other resources, including but not limited to, surface resources, which may be found in, upon, or under such lands.

(b) The Lessee shall conduct all operations on the Leased Lands whether they are surface or underground mining operations, and whether they are in lands in which the Lessor owns the surface or those in which the Lessor has disposed of the surface, in accordance with the provisions of 30 CFR Part 231 and 43 CFR Part 23. Both 30 CFR Part 231 and 43 CFR Part 23 are specifically incorporated by reference

into the provisions of this section. The provisions of 43 CFR Part 23 are hereby expressly made applicable to the Lessee's underground mining operations with equal force and effect to that given to those provisions in their application to surface mining operations and to operations on lands in which the Lessor owns the surface.

(c) The Lessee shall take such reasonable steps, and shall conduct operations in such a manner, as may be needed to avoid or, where avoidance is impracticable, to minimize and, where practicable, repair damage to: (1) any forage and timber growth on Federal or non-Federal lands in the vicinity of the Leased Lands; (2) crops, including forage, timber, or improvements to a surface owner; or (3) improvements, whether owned by the United States or by its permittees, licensees, or lessees. The Lessor must approve the steps to be taken and the restoration to be made in the event of the occurrence of damage described in this subsection.

(d) All water rights developed by the Lessee through operations on the Leased Lands shall immediately become the property of the Lessor. As long as the lease continues, the Lessee shall have the right to use those water rights free of charge for activities under the lease.

Section 13. Development by in situ methods

Where in situ methods are used for development of Oil Shale, the Lessee shall not place any entry, well, or opening for such operations within 500 feet of the boundary line of the Leased Lands without the permission of, or unless directed by, the Mining Supervisor, nor shall induced fracturing extend to less than 100 feet from that boundary line.

Section 14. Nuclear fracturing

No nuclear explosive may be detonated on or in the Leased Lands without the express written approval of the Secretary. The Secretary may approve the detonations of such explosives only after the preparation of an environmental impact statement pursuant to section 102(2(C) of the National Environmental Policy Act of 1969 (42 U.S.C. ss 4332(2)(C)).

Section 15. Inspection and investigation

The Lessee shall permit any duly authorized officer of representative of the Department at any reasonable time:

(a) to inspect or investigate the Leased Lands and all surface and underground improvements, works, machinery, and equipment, and all books and records pertaining to operations and surveys or investigations under this lease; and

(b) to copy and make extracts from any books and records pertaining to operations under this lease.

Section 16. Reports, maps, etc.

(a) At such times and in such a form as the Lessor may prescribe, the Lessee shall furnish a report with respect to investment and operations costs under this lease. The Lessee shall also submit to the Lessor in such form as the latter may prescribe, not more than 60 days after the end of each quarter of the Lease Year, a report covering that quarter which shall show the amount of each respective mineral or product produced from the Leased Deposits by each method of production used during the quarter, the character and quality thereof, the amount of products and by-products disposed of and price received therefor, and the amount in storage or held for sale. This report shall be certified by the superintendent of the mine, or by some other agent having personal knowledge of the facts who has been designated by the Lessee for that purpose.

(b) The Lessee shall prepare and furnish at such times and in such form as the Lessor may prescribe, maps, photographs, reports, statements and other documents required by the provisions of 30 CFR Part 231 and 43 CFR Part 23.

Section 17. Notice

Any notice which is required under this lease shall be given in writing. Where immediate action is required, notice may be given orally or by telegram, but, where this is done, the oral notice shall be confirmed in writing. Wherever this lease requires the Lessee to give notice, notice shall be given to the Mining Supervisor unless this lease requires that notice be given to another officer. The Lessee shall inform the Bureau State Office and the Mining Supervisor of the Lessee's officer to whom notice shall be given.

Section 18. Employment practices

The Lessee shall pay all wages due persons employed on the Leased Lands at least twice each month in lawful money of the United States. The Lessee shall grant all miners and other employees complete freedom of purchase. The Lessee shall restrict the workday to not more than 8 hours in any one day for underground workers, except in cases of emergency. The Lessee shall employ no person under the age of 16 years in any mine below the surface. If the laws of the State in which the mine is situtated prohibit the employment, in a mine below the surface, of persons of age greater than 16 years, the Lessee shall comply with those laws.

Section 19. Equal Opportunity Clause; certification of non-segregated facilities

(a) Equal Opportunity Clause. During the performance of this lease the Lessee agrees as follows: (1) The

Lessee shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Lessee shall take affirmative action to insure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Lessee shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Lessor setting forth the provisions of this Equal Opportunity clause.

(2) The Lessee shall, in all solicitations or advertisements for employees placed by or on behalf of the Lessee, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(3) The Lessee shall send to each labor union or representatives of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Lessor, advising the labor

union or workers' representative of the Lessee's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations and relevant orders of the Secretary of Labor.

(5) The Lessee shall furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Secretary of the Interior and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Lessee's noncompliance with the Equal Opportunity cause of this lease or with any of the said rules, regulations, or orders, this lease may be canceled, terminated or suspended in whole or in part and the lessee may be declared ineligible for further Federal Government contracts or leases in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended, and such other

sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended, or by rule, regulations, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Lessee shall include the provisions of Paragraphs (1) through (7) of this subsection (a) in every contract, subcontract, or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each contractor, subcontractor or vendor. The Lessee shall take such action with respect to any contract, subcontract or purchase order as the Secretary may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event the Lessee becomes involved in, or is threatened with, litigation with a contractor, subcontractor or vendor as a result of such direction by the Secretary, the lessee may request the lessor to enter into such litigation to protect the interests of the lessor.

(b) Certification of non-segregated facilities. By entering into this lease, the Lessee certifies that Lessee does not and shall not maintain or provide for Lessee's employees any segregated facilities at any of Lessee's establishments, and that Lessee does not and shall not permit Lessee's employees to perform their services at any location, under Lessee's control, where segregated facilities are maintained. The Lessee agrees that a breach of this certification is a violation of the Equal Opportunity clause in this lease. As used in this certification, the term "segregated facilities" means, but is not limited to, any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. Lessee further agrees that (except where Lessee has obtained identical certifications from proposed contractors and subcontractors for specific time periods) Lessee shall obtain identical certifications from proposed contractors and subcontractors prior to the award of contracts or subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that Lessee shall retain such certifications in Lessee's files and shall make them available to the Secretary at his request; and that Lessee shall forward the following notice to such proposed contactors and subcontractors (except where the proposed contractor or subcontractor has submitted identical certification for specific time periods): Notice to prospective contractors and subcontractors of requirement for certification of non-segregated facilities. A Certification of Non-segregated Facilities, as required by the May 9, 1967, order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a contract or subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semi-annually, or annually).

Section 20. Taxes

The Lessee shall pay, when due, all taxes lawfully assessed and levied under the laws of the State or the United States upon improvements, output of mines, or other rights, property, or assets of the Lessee.

Section 21. Monopoly and fair prices

The Lessor reserves full authority to promulgate and enforce orders and regulations under the provisions of Section 30 and 32 of the Act (30 U.S.C. ss187 and 189) necessary to insure that any sale of the production form the Leased Deposits to the United States or to the public is at reasonable prices, to prevent monopoly, and to safeguard the public welfare, and such regulations shall, upon promulgation, be binding upon the Lessee.

Section 22. Suspension of operations or production

Any suspension of operations or production under section 39 of the Act (30 U.S.C. ss209) granted with respect to this lease shall take effect as of the first day of the calendar month following the calendar month during which the suspension is approved, except that, in a situation where in the opinion of the Mining Supervisor there is an immediate danger to life, or of irreparable major damage to property or the environment, the Mining Supervisor may grant a suspension effective immediately. The terms of any suspension granted pursuant to the Lessee's request with respect to operations or production under this lease shall be in full calendar months. A suspension shall terminate either at the time designated in the suspension order of, if there is no time of termination in the order, at such time as the Mining Supervisor shall designate in subsequent notice to the Lessee.

Section 23. Readjustment of terms and conditions

The Lessor may propose the reasonable readjustment of the terms and conditions of this lease (including royalty provisions), the first readjustment to be effective at the twentieth Anniversary Date of this lease and subsequent readjustments to be effective at twenty Lease Year intervals thereafter. At lease 120 days before the appropriate Anniversary Date the Lessor shall give notice to the Lessee of any proposed readjustment of the terms and conditions of the lease and the nature thereof, and, unless the Lessee, within 60 days after receipt of such notice, files with the Lessor an objection to the proposed terms or relinquishes the lease as of the appropriate Anniversary Date, the Lessee shall be deemed conclusively to have agreed to such terms and conditions. If the Lessee files objections with the Lessor, the agreement cannot be reached between the Lessor and the Lessee within a period of 60 days after the filing of the objections, the lease may be terminated by either party upon giving 60 days' notice to the other party; however, the Lessor's right to terminate the lease shall be suspended by the Lessee's filing of a notice of appeal pursuant to Section 34 of this lease. If the Lessee files objections to the proposed readjusted terms and conditions, the existing terms and conditions (other than those concerning royalties) shall remain in effect until there has been an agreement between the Lessor and the Lessee on the new terms and conditions to be incorporated in the lease, or until the Lessee has exhausted his rights of appeal under Section 34 of this lease, or until the lease is terminated; however, the readjusted royalty provisions shall be effective until there is either agreement between the Lessor and the Lessee or until the lease is terminated. If the readjusted royalty provisions are subsequently rescinded or amended, the Lessee shall be permitted to credit any excess royalty payments against royalties subsequently due to the Lessor.

Section 24. Assignment

With respect to the assignment or transfer of any interest under this lease, the Lessee shall comply with the provisions of 43 CFR Subpart 3506 to the same extent as if the Subpart were specifically applicable to oil shale leases. The Lessor shall have no discretion to refuse to approve an assignment except: (1) where the assignee is not qualified to hold a lease under section 1 of the Act (30 U.S.C. ss181); (2) where the assignee is unable to provide an adequate bond; or (3) where either the assigned or the retained portion of the lease would, in the opinion of the Lessor, be too small to be economically developed.

Section 25. Overriding royalties

The Lessee shall not create, by assignment or otherwise, an overriding royalty interest in excess of 25 percent of the rate of royalty payable to the United States

under this lease or an overriding royalty interest which when added to any other outstanding overriding royalty interest exceeds that percentage, except that, where an interest in the leasehold or in an operating agreement is assigned, the assignor may retain an overriding royalty interest in excess of the above limitation if he shows to the satisfaction of the Department that he has made substantial investments for improvements on the lands covered by the assignment.

Section 26. Heirs and successors in interest

Each obligation hereunder shall extend to and be binding upon, and every benefit shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Section 27. Unlawful interest

No member of, or Delegate to, Congress or Resident Commissioner, after his election or appointment, either before or after he has qualified and during his continuance in office, and no officer, agent, or employee of the Department of the Interior, except as provided in 43 CFR 7.4(a)(1), shall be admitted to any share or part in this lease or derive any benefit that may arise therefrom; and the provisions of Section 3741 of the Revised Statutes of the

United States (41 U.S.C. ss22), as amended, and Sections 431, 432, and 433, Title 18 of the United States Code, relating to contracts, enter into and form a part of this lease so far as the same may be applicable.

Section 28. Relinquishment of lease

(a) Upon showing to the satisfaction of the Lessor that he has complied with the terms and conditions of this lease, the Lessee may relinquish the entire lease or any legal subdivision of the Leased Lands.

(b) A relinquishment must be filed, in duplicate, in the proper Bureau State Office. Upon its acceptance it shall be effective as of the date it is filed, subject to the continued obligation of the lessee and his surety, in accordance with the terms and conditions of this lease, (1) to make payment of all accrued bonus payments, rentals, and royalties, except as provided in section 5; (2) to provide for the preservation of any mines, in situ production works, underground development works, other permanent improvements, and other property, whether fixtures or personalty, on the Leased Lands; (3) to provide for the reclamation of lands and water affected by exploration or mining operations under this lease; and (4) to comply with all other applicable requirements of this lease.

Section 29. Remedies in case of default

If the Lessee shall fail to comply with any of the terms and conditions of this lease (including the terms and conditions of any development plan approved under section 10) and that default shall continue for a period of 30 days after service of notice thereof by the Lessor, the Lessor may (1) suspend operations until the required action is taken to correct noncompliance, or (2) institute appropriate proceedings in a court of competent jurisdiction for the forfeiture and cancellation of this lease as provided in Section 31 of the Act (30 U.S.C. ss188) and for forfeiture of any applicable bond. If the Lessee fails to take prompt and necessary steps to prevent loss or damage to the mine, property, or premises, or to prevent danger to the employees, or to avoid, or, where avoidance is impracticable, to minimize and, where practicable, repair danger to the environment, or, if immediate action by the Lessor, without waiting for action by the Lessee, is required for any of those purposes, the Lessor may enter on the premises and take such measures as he may deem necessary to prevent such loss, damage, or danger, or to correct the damaging, dangerous, or unsafe condition of the mine or any other facilities upon the Leased Lands, and those measures shall be at the expense of the Lessee.

Section 30. Effect of waiver

A waiver of any breach of the provisions of this lease shall extend only to that particular breach and shall not limit the rights of the parties with respect to any future breach. A waiver of a particular cause of forfeiture shall not prevent cancellation of this lease for any other cause, or for the same cause occurring at another time.

Section 31. Delivery of premises in case of forfeiture

In case of the termination of this lease in any manner the Lessee shall deliver to the Lessor, in the condition required by the reclamation requirements of approved exploration and development plans, and subject to the provisions of section 32 of this lease, the Leased Lands, including permanent improvements and other property on the Leased Lands, whether affixed to the ground or movable, and all underground shafts and timbering, well casing, and such other supports and structures as are necessary for the preservation of the Leased Lands, and any mines, other underground development works, or deposits in the Leased Lands.

Section 32. Disposition of property upon termination of lease

(a) Upon termination of this lease in any manner all underground timbering and any other supports or structures which the Lessor shall inform the Lessee are necessary for the preservation of any mines or other underground development works shall become and remain thereafter a part of the realty without the payment of any compensation to the Lessee. All other structures, equipment, machinery, tools, appliances, and materials on the Leased Lands, whether affixed to the ground or movable, shall remain the property of the Lessee upon the termination of this lease, but the Lessee shall have no right, for a period of six months following the termination, to remove from the Leased Lands any of that property which in the opinion of the Lessor is useful for the protection of the Leased Lands (including any mines in those lands) unless the Lessor shall expressly authorize the removal. During the six-month period the Lessor shall have the right to purchase at the appraised value any or all items of that property required or useful for the protection of the Leased Lands. The appraised value shall be fixed by three disinterested and competent persons (one to be designated by the Lessor, one by the Lessee, and the third by the two so designated), and the appraised value determined by the three or a majority of them shall be conclusive.

(b) At any time within a period of 90 days after either the Lessor has informed the Lessee that he will not purchase the property or the expiration of the 6-month period, the Lessee shall have the right to remove from the premises the property which was not purchased by the Lessor.

(c) Any structures, machinery, equipment, tools, appliances, and materials, subject to removal by the Lessee as provided above, which are allowed to remain on the Leased Lands shall become the property of the Lessor on expiration of the 90-day period or any extension of that period which may be granted by the Lessor because of adverse climatic conditions or other good and sufficient reason, unless the Lessor shall direct the Lessee to remove any or all of such property on expiration of the 90-day period. If the Lessor directs the Lessee to remove such property, the Lessee shall do so at his own expense or, if he fails to do so within a reasonable period, the Lessor may do so at the Lessee's expense.

Section 33. Protection of proprietary information

(a) This lease, and any activities thereunder, shall not be construed to grant a license, permit or other right of use or ownership to Lessor, or any other person, of the patented processes, trade secrets, or other confidential or privileged technical information (hereafter in this section called "technical processes") of the Lessee or any other party

whose technical processes are embodied in improvements on the Leased Lands or used in connection with the lease. Notwithstanding any other provision of this lease, the Lessor agrees that any technical processes obtained from the Lessee which are designated by the Lessee as confidential shall: (1) not be disclosed to persons other than employees of the Federal Government having a need for such disclosures; (2) not be copied or reproduced in any manner except as required specifically by the Mining Supervisor; and (3) not be used in any manner that will violate their proprietary nature unless the Mining Supervisor shall make a written determination that such technical processes do not contain trade secreta or are not confidential, or unless such disclosure is required by statute; provided however, that before any such publication or disclosure, except where the overriding national interest demands otherwise, the Mining Supervisor shall notify the Lessee of the proposed disclosure and those to whom the disclosure will be made, provide a copy of the written determination, and allow the Lessee 30 days to submit additional material supporting its claim of confidentiality or otherwise to initiate an appeal from the decision of the Mining Supervisor prior to any disclosure.

(b) In the event the lease is terminated and the Lessor elects pursuant to section 32 to purchase machinery or equipment the use of which would involve technical processes in the operations of the purchased machinery, the Lessor shall hsve the right to use those technical processes in the operations of the purchased machinery or equipment; provided that (1), with respect to third parties' technical processes which the Lessee has obtained the right to use by contract or agreement, the Lessor shall replace the Lessee as a party to the contract or agreement, and (2) with respect to technical processes owned, developed or controlled by the Lessee itself, the Lessor shall agree to pay the Lessee fair market value for use of the Lessee's technical processes in said operations. Any contract or agreement into which the Lessee shall enter with a third party for the right to sue technical processes belonging to that third party shall provide that the Lessor may become a party to that contract or agreement to the extent that those processes may be used for the protection of the Leased Lands. If the Lessee and the Lessor shall not agree as to the fair market value of the Lessee's technical processes, that value shall be determined as provided in section 32(a) for other property acquired by the Lessor upon termination of the lease.

Section 34. Lessee's liability to the Lessor

(a) The Lessee shall be liable to the United States for any damage suffered by the United States in any way arising from or connected with Lessee's activities and operations conducted pursuant to this lease, except where damage is caused by employees of the United States acting within the scope of their authority.

(b) The Lessee shall indemnify and hold harmless the United States from any and all claims arising from or connected with Lessee's activities and operations under this lease.

(c) In any case where liability without fault is imposed on the Lessee pursuant to this section, and the damages involved were caused by the action of a third party, the rules of subrogation shall apply in accordance with the law of the jurisdiction where the damage occurred.

Section 35. Appeals

The Lessee shall have the right to appeal (a) under 43 CFR 3000.4 from any action or decision of any official of the Bureau, (b) under 30 CFR 231.74 from any action, order, or decision of any official of the Geological Survey, or (c) under applicable regulations from any action or decision of any other official of the Department, arising in connection with this lease, including any action or decision pursuant to section 23 of this lease with respect to the readjustment of terms and conditions.

Section 36. Interpretation of this lease

(a) The paragraph headings in this lease are for convenience only, and do not purport to, and shall not be deemed to, define, limit, or extend the scope or intent of the paragraph to which they pertain.

(b) As used in this lease, unless the context clearly indicates otherwise, a word in the masculine or neuter form shall be interpreted as equally applicable to the masculine, feminine, and neuter genders, and words in singular form shall be interpreted as equally applicable to singular and plural numbers.

THE UNITED STATES OF AMERICA

BY

State Director
(Title)

FEB 5 1974
(Date)

Witnesses to Signature of Lessees

Attest
Secretary

Standard Oil Company
(Signature of Lessee) KRG
Vice President

Attest
Assistant Secretary

Gulf Oil Corporation
(Signature of Lessee)
Executive Vice President

OIL SHALE LEASE ENVIRONMENTAL STIPULATIONS

SECTION 1. GENERAL

(A) Applicability of Stipulations

The terms, conditions, requirements and prohibitions imposed upon Lessee by these Stipulations are also imposed upon Lessee's agents, employees, contractors, and sub-contractors, and their employees. Failure or refusal of Lessee's agents, employees, contractors, sub-contractors, or their employees to comply with these Stipulations shall be deemed to be the failure or refusal of the Lessee. Lessee shall require its agents, contractors, and sub-contractors to include these Stipulations in all contracts and sub-contracts which are entered into by any of them, together with a provision that the other contracting party, and its agents, employees, contractors and sub-contractors, and the employees of each of them, shall likewise be bound to comply with these stipulations.

(B) Changes in Conditions

These Stipulations are based on existing knowledge and technology. They may be revised or amended by mutual consent of the Mining Supervisor, the Bureau District Manager, and the Lessee at any time to adjust to changed conditions or to correct an oversight. The Lessor may amend these stipulations at any time without the consent of the Lessee in order to make these stipulations consistent with any new Federal or State statutes for the protection of the environment upon their enactment and with regulations issued under those statutes. The Lessee, the Mining Supervisor, and the Bureau District Manager shall meet at least once a year to review advances in technology and, in a mutual endeavor, weigh, and decide the feasibility and need of revising or amending existing Stipulations.

The Lessor and the Lessee agree that, in this mutual endeavor to decide upon the feasibility and need for amending the existing Stipulations, they will act in good faith and in a sincere effort to make the Lessee's activities under the lease as free from environmental damage as is practicable. Toward this end, systems which require pollution control devices shall possess sufficient flexibility to adopt improved technology at practicable intervals and shall be constructed with the understanding that continued compliance with changing pollution control laws is required.

(C) Collection of Environmental Data and Monitoring Program

(1) The Lessee shall compile data to determine the conditions existing prior to any development operations under the lease and shall, except as provided below, conduct a monitoring program before, during, and subsequent to development operations. The Lessee shall conduct the monitoring program to provide a record of changes from conditions existing prior to development operations, as established by the collection of baseline data, a continuing check on compliance with the provisions of the lease (including these attached

Stipulations) and all applicable Federal, State, and local environmental protection and pollution control requirements, timely notice of detrimental effects and conditions requiring correction, and a factual basis for revision or amendment of these Stipulations pursuant to Section 1(B) hereof. Both the types of baseline and subsequent data required and the methods to be used for the collection of the baseline data and the conduct of the monitoring program shall be those set forth in paragraph (2) of this subsection. The baseline data shall be collected for a period of at least two consecutive full years, one full year of which shall be prior to the submission of the detailed development plan under section 10(a) of this lease. If the detailed development plan is submitted prior to the collection of the second year's data, the plan already submitted shall, at the discretion, or with the approval, of the Mining Supervisor, be modified as necessary as a result of study of the additional baseline data. Exploratory operations, as approved by the Mining Supervisor, shall be permitted during the collection of the baseline data. All records of baseline data and subsequent monitoring required by this subsection shall be submitted to the Mining Supervisor at intervals to be prescribed by him.

(2) In collecting baseline data and conducting a monitoring program the Lessee shall adopt the following methods and shall collect the information required below. Wherever the number and placing of testing installations are not given, they shall be as

determined by the Lessee, but subject to being changed as required by the Mining Supervisor. After the collection of the required baseline data for at least two years, the Lessee shall not be required to conduct a monitoring program on the Leased Lands until a date six months prior to the commencement of development operations. The monitoring program shall, thereafter, be conducted until the Mining Supervisor has determined to his satisfaction that environmental conditions have been established after the termination of development operations which are consistent with the requirements of applicable Federal and State statutes and regulations; however, the Mining Supervisor may terminate this requirement at an earlier date where it is in the public interest.

(a) Surface water. The Lessee shall construct gauging stations on the major drainages of the Leased Lands and, as required by the Mining Supervisor, upstream and downstream from the Leased Lands. Data collected at the stations shall include continuous streamflow records, continuous water temperature records, periodic analyses for selected inorganic and organic chemical constituents, as directed by the Mining Supervisor, continuous precipitation records, and continuous sediment records. The Lessee shall maintain records of all information obtained under this paragraph (2)(a).

(b) Ground water. At each proposed or actual mine site. the Lessee shall drill a test well and shall install an observation well in each water-bearing zone defined by the test well. The Lessee shall collect samples of drill cuttings and shall make borehole geophysical logs as directed by the Mining Supervisor. The Lessee shall isolate each water-bearing zone penetrated by the test wells and pump each of the zones for the period required by the Mining Supervisor. During pump tests the Lessee shall record the water-level fluctuations in each of the observation wells, maintain steady, continuous discharge from the test well, and record the discharge measurements. The Lessee shall maintain records of water level and temperature on each test well and on each observation well pursuant to a measurement schedule specified by the Mining Supervisor. At the initial pump test of each well the Lessee shall determine the water quality of that well by analyzing water samples for organic and inorganic chemical constitutents, including, without limitation, trace constituents subject to drinking water standards and water pollution control regulations. The Mining Supervisor may require analysis of samples for such additional constituents as he may deem desirable. After the initial test, the Lessee shall collect water samples from each well at six-month intervals and analyze them for evidence of trends in water quality as determined by comparing the samples with previous analyses.

The Lessee shall complete one observation well upgradient from each spent shale disposal site and at least two observation wells downgradient from the site at depths and locations specified by the Mining Supervisor. The Mining Supervisor may require additional observation wells if there is evidence that they are needed to provide adequate monitoring of the water quality of an aquifer. The Lessee shall record water levels and temperatures in each observation well pursuant to a measurement schedule established by the Mining Supervisor. The Lessee shall determine the water quality of each observation well by analyzing samples for organic and inorganic chemical constituents, including, without limitation, trace constituents subject to drinking water stsndards and water pollution controls. The Mining Supervisor may require analysis of samples for such additional constituents as he may deem desirable. After the initial test of an observation well the Lessee shall collect water samples from the well at six-month intervals and analyze them for evidence of trends in water quality as determined by comparing the samples with previous analyses.

The Lessee shall maintain records of all information obtained under this paragraph (2)(b).

(c) Air Quality. In the collection of baseline data, the Lessee shall monitor air quality over at least 90 percent of each lease year, during which monitoring is required, using four strategically-located stations. One of the stations shall be at the expected point of maximum concentrations, or as close to that expected point of msximum concentration as feasible.

The Lessee shall monitor air quality for sulphur dioxide, hydrogen sulphide, and suspended particulates, using automatic instruments with continuous records, when applicable. The Lessee shall also monitor, under the same conditions, hydrocarbons, oxides of nitrogen, and other pollutants, where the Mining Supervisor has determined that such monitoring is necessary to determine baseline air quality or to conduct an effective monitoring program. In addition, the Lessee shall establish a meteorological station in reasonable proximity to each proposed plant site to monitor, at least 95 percent of the time over each lease year during which monitoring is required, wind direction and speed (vane and anemometer) and humidity at three levels, one at least 100 feet above the surface of the plant site, one at approximately 30 feet above the surface of the plant site, and one at ground level, and temperature at two levels, one at least 100 feet above the surface of the plant site, and one at approximately 30 feet above the surface of the plant site. The Lessee shall maintain records of all baseline data collection and monitoring programs.

(d) Flora and Fauna. The Lessee shall make studies of the flora and fauna of the leased lands and of all other lands lying within a mile of the leased lands, and of all lands to be used for disposal of residues from mining and processing oil shale and also of the aquatic habitat as far downstream as the Mining Supervisor shall require. These studies will determine the distribution and density of the flora in these areas and periodically determine the condition of such flora. These studies shall also

determine the species of fauna, there distribution, and their abundance at bi-monthly intervals. The Lessee shall submit a report to the Mining Supervisor of the baseline data obtained and, during the monitoring program, shall submit semi-annual reports to the Mining Supervisor showing whether or not there has been any change. The Lessee shall also study, and report to the Mining Supervisor on ecological interrelationships including migratory patterns of birds, mammals, and fish, and plant animal relationships. The Lessee shall compile an inventory of natural surface water features, such as springs and seeps.

(e) Soil Survey and Productivity Assessment. The Lessee shall conduct a soil survey and productivity assessment of all portions of the Leased Lands proposed to be disturbed under the detailed development plan. This survey must include the preparation of maps, tables, and reports describing soil types, depth of the various layers of soil, but not more than a depth of 50 feet from the surface to be disturbed, strike and dip of the material, slopes, solar exposure, vegetation cover, and erodability.

(3) The environmental monitoring program shall be an integral part of the detailed development plan required in Section 10 of the lease, and at the time of the submission of the plan the Lessee shall provide the Mining Supervisor with a complete compilation of the baseline data collected above and the record of the monitoring program for any period subsequent to the conclusion of that compilation.

(4) Not more than one year after obtaining approval of the detailed mining plan and on each subsequent anniversary date the Lessee shall submit to the Mining Supervisor a report of the baseline data collected and a report of the monitoring programs as a part of the required annual progress reports on the development program. This portion of the annual report will be subject to public review and comment.

(D) Emergency Decisions

Any decisions or approvals of the Mining Supervisor required by these Stipulations to be in writing may in emergencies be issued orally, with written confirmation as soon thereafter as possible.

(E) Environmental Briefing

During the life of this Lease, Lessee shall provide that such Federal and State employees as may be designated by the Mining Supervisor shall brief personnel on environmental and other pertinent matters. The Lessee shall provide for such briefings upon the request of the Mining Supervisor, but the Mining Supervisor shall request only such briefings as may be reasonably necessary to effectuate the provisions of this Lease. Lessee shall make arrangements for the time, place, and attendance at such briefings. Lessee shall bear all costs of such briefings other than salary, per diem, subsistence and travel costs of Federal and State employees.

(F) Construction Standards

The general design of all buildings and structures shall comply with the latest edition of the Uniform Building Code (U.B.C.). Structural steel shall be designed in accordance with the latest edition of the American Institute of Steel Construction "Specifications for Design, Fabrication and Erection of structural Steel for Buildings." Reinforced concrete shall comply with the latest edition of the American Concrete Institute's Building Code Requirements for Reinforced Concrete." Engineering works for impoundments shall conform to standard engineering practice sufficient to withstand the 100-year flood in the drainage in which installed.

(G) Housing and Welfare of Employees

In the exercise of his right under section 2 of the Lease to construct buildings and other facilities for the housing and welfare of his employees, the Lessee shall at all times make certain that these facilities are situated, constructed, operated, and maintained in an orderly manner, satisfactory to the Mining Supervisor. While no general restriction is imposed upon the construction of facilities necessary to the employees' health and well-being, such construction shall be subject to the Mining Supervisor's approval and shall not unreasonably damage the environment of the leased lands.

(H) Posting of Stipulations and Plans

The Lessee shall insure that copies of these stipulations and any approved exploration and development plans are available at the operating sites and for inspection by all on-the-ground operating personnel.

SECTION 2. ACCESS AND SERVICE PLANS

(A) Transportation Corridor Plans

The Lessee shall provide corridor plans for roads, pipelines and utilities on the Leased Lands for approval by the Mining Supervisor. Each plan shall include probable major design features and plans for the protection of the environment, prevention of pollution, minimization of erosion, rehabilitation and revegetation of all disturbed areas not required in operation of the transportation system, both during and after construction. The Lessee shall, to the maximum extent practicable, make use of multi-use corridors for roads, pipelines and utilities.

(B) Regulation of Public Access

After road construction is completed, the Lessee shall, upon consultation with the Lessor, permit reasonable, free and unrestricted public access to and upon the road and rights-of-way for all lawful and proper purposes except in plant sites, mine sites, disposal areas, and other operational areas which may be closed to the general public. The Lessee shall regulate public

access and public vehicular traffic as required to facilitate operations and to protect the public and, to the extent reasonable, livestock and wildlife from hazards associated with construction. For this purpose the Lessee shall provide warnings, flagmen, barricades, and other safety measures as necessary. Whenever the Mining Supervisor shall determined that the Lessee's regulation of access and traffic is unreasonable, or that the Lessee's provision of safety measures is inadequate, he shall so inform the Lessee who shall immediately take corrective measures.

(C) Existing and Planned Roads and Trails

Where feasible, the Lessee shall use existing roads and trails. Unless the Mining Supervisor shall direct otherwise, roads and trails shall be located, constructed, maintained, and closed according to the specifications of the Bureau of Land Management and shall include drainage structures where needed.

(D) Waterbars and Breaks

The Lessee shall divert runoff from roads and uphill slopes by means of waterbars, waterbreaks, or culverts constructed in accordance with Bureau specifications.

(E) Pipeline Construction Standards

In the design and construction of oil pipelines and the choice of materials for them, the Lessee shall follow the standards (wherever they may be made applicable) established by the Department of Transportation and, if these standards should ever be revised, supplemented, or superseded, shall follow the new standards in new construction. These standards include:

(1) 49 CFR 192, Transportation of Natural and Other Gas by Pipeline; and

(2) 49 CFR 195, Transmission of Liquids by Pipeline.

(F) Pipeline Safety Standards

The Lessee shall meet, where applicable, the safety standards and reporting requirements set forth in the following, as now in effect and as hereafter amended, or, if these regulations should be superseded, the regulations or other rules superseding them:

(1) 49 CFR, Part 110, Carriers by Pipeline (Other than Natural Gas and Water);

(2) 49 CFR, Part 192, Transportation of Natural and Other Gas and Water);

(3) 49 CFR, Part 195, Transmission of Liquids by Pipeline;

(G) Shut-Off Valves

The Lessee shall insure that oil transportation pipeline designs provide for automatic shut-off valves at each pumping or compressor station and such additional valves as may be necessary in view of:

(1) Terrain and drainage systems traversed;

(2) Population centers;

(3) Wildlife and fishery habitat;

(4) Public water supplies and significant water bodies;

(5) Hazardous geologic areas; and

(6) Scenic Values.

The Lessee shall install any additional valves required by the Mining Supervisor.

(H) Pipeline Corrosion

With regard to oil transportation pipelines, the Lessee shall submit detailed plans to the Mining Supervisor for corrosion-resistant design and methods for early detection of pipeline corrosion. These shall include: (1) pipe material and welding techniques to be used and information on their particular suitability for the environment involved; (2) details on the external pipe protection to be provided (coating, wrapping, etc.), including information on variation of the coating process to cope with variations in environmental factors; (3) plans for cathodic protection including details of impressed ground sources and controls to insure continuous maintenance of adequate protection over the entire surface of the pipe; (4) details of plans for monitoring cathodic protection current including spacing of current monitors; and (5) provision of periodic surveys of trouble spots, regular preventive maintenance surveys, regular surveys for external and internal deterioration which may result in failure, and special provisions for abnormal potential patterns resulting from crossing with other pipelines or cables.

(I) Electric Transmission Facilities

The Lessee shall design and construct telegraph, telephone, electric powerlines, distribution lines and other transmission facilities in accordance with the guidelines set forth in "Environmental Criteria for Electric Transmission System" (U.S.D.I., U.S.D.A., 1970), as now or in the future amended, or if these guidelines should be superseded, in the guidelines or other rules superseding them. Distribution lines shall be designed and constructed in accordance with REA Bulletin 61-10 (Powerline Contacts by Eagles and other Large Birds), as now or in the future amended, or, if these guidelines should be supersedes, in the guidelines or other rules superseding them.

(J) Natural Barriers

Where a road or exploratory site cuts a natural barrier used for livestock control, the Lessee shall, at his own expense, close the opening by the use of a fence of other suitable barrier meeting Bureau standards.

(K) Specifications for fences, and Cattleguards

Fences and cattleguards constructed by the Lessee shall meet established Bureau specifications and standards.

(L) Crossings

The Lessee shall take all steps necessary to make certain that roads constructed under this lease do not prevent or unreasonably disrupt the use of existing roads, foot trails, pipelines, and other rights-of-way or major animal migration routes. This requirement shall include the construction of suitable overhead or underground crossings where they are determined to be necessary by the Mining Supervisor.

(M) Alternate Routes

If during construction the Lessee's activities shall interfere with the free use of existing roads and trails used by persons, whether or not recorded, he shall provide such alternate roads and trails as the Mining Supervisor may determine to be needed.

(N) Off-Road Vehicle Use

The Lessee shall use off-road vehicles in a manner consistent with applicable regulations.

SECTION 3. FIRE PREVENTION AND CONTROL

(A) Instructions of the Mining Supervisor

(1) The Lessee shall comply with the instructions and directions of the Mining Supervisor concerning the use, prevention and suppression of fires, and shall make every reasonable effort to prevent, control and suppress any fire on land subject to the lease. Uncontrolled fires must be immediately reported to the Mining Supervisor.

(2) (a) The Lessee shall construct fire lines or perform clearing when determined by the Mining Supervisor to be necessary for forest, brush and grass fire prevention.

(b) The Lessee shall comply with the National Fire Codes on handling, transportation, storage, use and disposal of flammable liquids, gases, and solids.

(c) The Lessee shall take all appropriate actions to prevent oil shale outcrop fires.

(B) Liability of Lessee

The control and suppression of any fires on the Leased Lands (or on adjoining public lands which have spread from the Leased Lands) caused by the Lessee or his employees, contractors subcontractors, or agents shall be at the expense of the Lessee. Upon the failure of the Lessee to control and suppress such fires in a manner satisfactory to him, the Mining Supervisor shall take such steps as are necessary to control and suppress the fire, either alone or in conjunction with other Federal, State, and local authorities, and the cost of such control and suppression shall be borne by the Lessee.

SECTION 4. FISH AND WILDLIFE

(A) Management Plan

The Lessee shall submit for approval by the Mining Supervisor, as part of the exploration and mining plan, a detailed fish and wildlife management plan which shall include the steps which the Lessee shall take to: (1) avoid or, where avoidance is impracticable, minimize damage to fish and wildlife habitat, including water supplies; (2) restore such habitat in the event it is unavoidably destroyed or damaged; (3) provide alternate habitats; and (4) provide controlled access to the public for the enjoyment of the wildlife resources on such lands as may be mutually agreed upon. The plan shall include, but not be limited to, detailed information on activities, time schedule, performance standards, proposed accomplishments, and ways and means of avoiding or minimizing environmental impacts on fish and wildlife.

(B) Mitigation of Damage

Wherever destruction or significant disturbance of fish and wildlife habitat is inevitable, the Lessee shall submit, for the Mining Supervisor's approval at least 60 days prior to the destruction or damage of the habitat, those measures which the Lessee proposes to take to comply with the requirement of 30 CFR 231.4(b), as now in effect or as hereafter amended, or, if that regulation should be superseded, the regulations or other rules superseding it, to avoid, or, where avoidance is impracticable, minimize and repair, injury or destruction of fish and wildlife and their habitat. As a general rule, the proposed measures should provide for habitat of similar type and equal in quantity and quality to that destroyed or damaged. The Mining Supervisor shall, within 60 days after the submission of the proposed measures to him, either approve or disapprove them. If he shall approve them, the Lessee shall execute the proposed measures for the mitigation of the destruction or damage of the habitat. If the Mining Supervisor shall disapprove the measures, he shall offer the Lessee an opportunity for consultation at which, whenever possible, he shall inform the Lessee of any changes which will make the measures acceptable.

(C) Big Game

The Lessee shall construct big game drift fences when and where necessary to direct big game movements around or away from oil shale development areas.

(D) Posting of Notices

The Lessee shall post in reasonable and conspicuous places notices informing its employees, agents, contractors, subcontractors, and their employees of all applicable laws and regulations governing hunting, fishing, and trapping.

SECTION 5. HEALTH AND SAFETY

(A) In General

The Lessee shall take all measures necessary to protect the health and safety of all persons affected by its activities and operations and shall immediately abate any activity or condition which threatens the life of any person or which threatens any person with bodily harm.

(B) Compliance with Federal Health and Safety Laws and Regulations

The Lessee shall comply with the Federal Metal and Non-metallic Mine Safety Act of 1966 (30 U.S.C. ss 721-740), as now in effect or as hereafter amended, or, if it should be superseded, with the statute superseding it, and the Occupational Health and Safety Act of 1970 (29 U.S.C. ss 651-678), as now in effect, or as hereafter amended, or, if it should be superseded, with the statute superseding it, and all health and safety standards promulgated pursuant thereto.

(C) Use of Explosives

The Lessee shall insure that all blasting operations, including the purchase, handling, transportation, storage, use, and destruction of blasting agents are performed in conformance with Public Law 91-452, October 15, 1970 (18 U.S.C. ss841-848), as now in effect or as hereafter amended, or if it should be superseded, with the statute superseding it, and the regulations promulgated thereunder which are now in 26 CFR 181.

SECTION 6. HISTORIC AND SCIENTIFIC VALUES

(A) Cultural Investigations

The Lessee shall, prior to construction or mining, conduct a thorough and professional investigation of any portion of the Leased Lands to be used, including, but not limited to, those areas to be used for mining, processing, or disposal operations or roads, for objects of historic or scientific interest, including, but not limited to, Indian ruins, pictographs and other archeological remains. The Lessee shall report the results of these investigations of the Mining Supervisor before commencing construction and mining operations.

(B) Objects of Historic or Scientific Interest

The Lessee shall not in any activities under this lease appropriate, remove, injure, deface, or alter any object of antiquity, or of historic, prehistoric, or scientific interest, including, but not limited to, Indian ruins, pictographs, and other archeological remains. Where a question exists as to whether or not an object is of historic, prehistoric, or scientific interest or is an object of antiquity, the Lessee shall report to the Mining Supervisor for a final determination of which he shall inform the Lessee without unnecessary delay.

SECTION 7. OIL AND HAZARDOUS MATERIALS

(A) Spill Contingency Plans

The Lessee agrees to submit spill contingency plans to the Mining Supervisor with the detailed development plan. This plan shall provide for the control of spills of oil or other hazardous substance which for purposes of this Section 7 shall be defined in section 311(a)(14) of the Federal Water Pollution Control Act, as amended (86 Stat. 816, 863), as now in effect or as hereafter amended, or if it should be auperseded, the statute superseding it.

The plans shall conform to this Stipulation and the National Oil and Hazardous Substances Pollution Contingency Plan, 36 FR 16215, August 20, 1971, as now in force or as hereafter amended, or, if it shall be superseded, the document superseding it, and shall: (1) include a description of positive spill prevention efforts which the lessee shall make; (2) include provisions for spill control; (3) provide for immediate corrective action including spill

control and restoration of the affected resource; (4) provide that the Mining Supervisor shall approve any materials or devices used for spill control and shall approve any disposal sites or techniques selected to handle spilled matter; and (5) include separate and specific techniques and schedule for cleanup of spills on land, rivers and streams. As used in this Stipulation, spill control is defined as including detection, location, confinement, and cleanup of the spill.

(B) Responsibility

If, during operations, any oil or other hazardous substance should be discharged, the control, removal, disposal, and cleanup of that substance, wherever found, shall be the responsibility of Lessee. Upon the failure of the Lessee to control, remove, dispose of, or clean up the discharge, or to repair all damages resulting therefrom, the Mining Supervisor may take such measures as he deems necessary to control, remove, dispose of, or clean up the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the Lessee. Such action by the Mining Supervisor shall not relieve Lessee of any responsibility as provided in this lease.

(C) Reporting of Spills and Discharges

The Lessee shall give immediate notice of any spills or discharges of oil or other hazardous substances to: (1) the Mining Supervisor and (2) such other Federal and State officials as are required by law to be given such notice. Any oral notice shall be confirmed by the Lessee in writing as soon as possible.

(D) Storage and Handling

The Lessee shall store oil, pertroleum products, industrial chemicals and similar toxic or volatile materials in durable contains and locate such materials so that any accidental spillage will not drain into water courses, lakes, reservoirs, or ground water. Unless otherwise approved by the Mining Supervisor, the Lessee shall store substantial quantities (more than 500 gallons) of such materials in an area surrounded by impermeable containment structures. The volume of the containment structures shall be at least: (1) one-hundred fifty (150) percent of the total storage volume of storage tanks in the relevant area; plus (2) a volume sufficient for maximum trapped precipitation and run-off which might be impounded at the time of a spill.

(E) Pesticides and Herbicides

The Lessee shall not use pesticides and herbicides without the approval of the Mining Supervisor. Pesticides and herbicides shall be considered treatments of last resort, to be used only when reasonable slternatives are not available and where their use is consistent with protection and enhancement of the environment. Where pesticides and herbicides are used, they shall be used only with the approval of the Mining Supervisor and the type, amount, method of application, storage, and disposal shall be in accordance with applicable Federal and State procedures.

SECTION 8. POLLUTION--AIR

(A) Air Quality

The Lessee shall utilize and operate all facilities and devices in such a way as to avoid, or, where avoidance is impracticable, minimize air pollution. At all times during construction and operation, Lessee shall conduct its activities in accordance with all applicable air quality standards and related plans of implementation adopted pursuant to the Clean Air Act, as amended (40 U.S.C. ss1857-1857-1), as now in effect or as hereafter amended, or if it should be superseded, the statute superseding it, and applicable State standards.

(B) Dust

The Lessee shall make every reasonable effort to avoid, or, where avoidance is impracticable, minimize dust problems. Where necessary, sprinkling, oiling, or other mean of dust control shsll be required on roads and trails. The Lessee shall conduct processing operations so as not to create environmental or health problems associated with dust.

(C) Burning

The Lessee shall not burn waste, timber, or debris, except where disposal is essential and other methods of disposal would be more harmful to the environment and when authorized by the Mining Supervisor.

SECTION 9. POLLUTION--WATER

(A) Water Quality

The Lessee shall utilize and operate all facilities and devices in such a way as to avoid or, where avoidance is impracticable, minimize water pollution. At all times during construction and operation, Lessee shall conduct its activities in accordance with all applicable Federal and State water quality standards and related plans of implementation, as then in force. Where applicable Federal and State standards do not exist, the Mining Supervisor may establish reasonable standards to prevent degradation of water, and the Lessee shall comply with those standards. The Lessee shall not discharge waste water into any aquifer deemed by the Mining Supervisor to be a potentially valuable water supply nor into any aquifer which will discharge the waste into a surface stream.

(B) Disturbance of Existing Waters

All construction activities, exclusive of actual mining activities, that may cause the creation of new lakes, drainage of existing ponds, diversion of natural drainages, alternation of stream hydraulics, disturbance of areas of stream beds or degradation of land and water quality or adversely affect the environmental integrity of the area are prohibited unless approved in writing by the Mining Supervisor.

(C) Control of Waste Waters

In areas where overburden, water, or waste from mines or processing plants might contain toxic or saline materials, the Lessee shall:

(1) Divert surface or ground water so as to avoid the formation of toxic and saline water and its drainage into streams, or, where avoidance is impracticable, to minimize the formation of such waters and drainage, by preventing the entry of reducing the flow of water into the workings, waste piles, or overburden-storage areas;

(2) Dispose of refuse and spent shale from mining and processing in a manner which will avoid the discharge of toxic drainage or saline water into surface or ground water;

(3) Employ, upon termination of operations or use of any mine, processing plant, or waste disposal site, all practicable closing measures consistent with ecological principles and safety requirements in order to avoid the formation and discharge of toxic or saline water;

(4) Dispose of toxic and saline water derived from mining, processing, or refining operations in a manner that does not pollute surface or ground waters;

(5) During mining operations, monitor spoil and refuse for the presence of materials likely to yield unacceptable alkaline, acidic, saline, or toxic solutes; and

(6) Reinject no water, except in compliance with Federal and State standards then in effect and where authorized to do so by the Mining Supervisor; if the Lessee does reinject water, he shall establish such monitoring as the Mining Supervisor shall require.

(D) Cuts and Fills

The Lessee shall not cut or fill near or in streams which will result in siltation or accumulation of debris unless approved in writing by the Mining Supervisor.

(E) Crossings

The location of crossings of perennial streams, lakes and rivers must be approved in writing by the Mining Supervisor. To control erosion, the Lessee shall maintain buffer strips at least 200 feet wide on each side of a stream in their natural and undisturbed state unless otherwise authorized in writing by the Mining Supervisor.

(F) Road Surfacing Material

All road surfacing material used by the Lessee must be approved by the Mining Supervisor.

SECTION 10. POLLUTION--NOISE

The Lessee shall comply with all applicable Federal and State standards on noise pollution, as now in effect or as hereafter amended, or, if they should be superseded, the standards superseding them. In the absence of specific noise pollution standards, the Lessee shall keep noise at or below levels safe and acceptable for humans, as determined by the Mining Supervisor.

SECTION 11. REHABILITATION

(A) In General

The Lessee shall, in accordance with approved plans, rehabilitate all affected lands to a usable and productive condition consistent with or equal to pre-existing land uses in the area and compatible with existing, adjacent undisturbed natural areas. Rehabilitation methods include, but are not limited to the following: leveling, backfilling, covering the surface with topsoil, and revegetating the spoil banks and pit areas consistent with sound restoration methods. The Lessee shall leave reclaimed land in a usable, non-hazardous condition such that soil erosion and water pollution are avoided or minimized. The Lessee shall, to the extent practicable, conduct such backfilling, leveling and grading concurrently with the mining operations. Upon removal of property at termination of the Lease pursuant to Sections 31 and 32 of the Lease, the Lessee shall, in accordance with approved plans, complete the restoration of affected lands to a usable and productive condition at least equal to pre-existing land uses in the area and compatible with existing adjacent undisturbed natural areas.

(B) Management Plan

The Lessee shall submit for approval by the Mining Supervisor an erosion control and surface rehabilitation plan as part of any exploration or development plan. The initial plan shall be submitted not less that 60 days prior to start of mining site preparation and updated each year thereafter before March 15. The plan shall include, but not be limited to, detailed information on activities, areas, time schedules, standards, accomplishments, and methods of eliminating or minimizing oil shale development impacts. The Lessee shall base erosion control plans and procedures on a maximum 100-year precipitation rate characteristic of the area. If a 100-year rate is not available the Lessee shall use data based on the longest period of reliable information. Procedures and plans shall consider flash flood effects, mud flows, mudslides, landslides, rock falls, and other similar types of material mass movements.

(C) Stabilization of Disturbed Areas

The Lessee shall leave all disturbed areas in a stabilized condition. Stabilization practices shall include, as determined by the needs of specific sites: seeding; planting; mulching; and the placement of mat binders, soil binders, rock or gravel blankets or other such structures. Seeding and planting shall be repeated, as often as the Mining Supervisor shall deem reasonable, if prior attempts to revegetate are unsuccessful. All trees, snags, stumps or other vegetative material, not having commercial, ecological, wildlife, or construction values, shall be considered for mechanical chipping and spreading in a manner that will aid seeding establishment and soil stabilization.

(D) Surface Disturbance On-Site

The Lessee shall correct surface disturbance which may induce soil movement or water pollution, or both, whether during or after construction or mining, in accordance with the surface rehabilitation plan.

(E) Areas of Unstable Soils

The Lessee shall, where possible, avoid areas having soils that are susceptible to slides and slips, excessive settlement, severe erosion and soil creep during construction or operation. When such areas cannot be avoided the Lessee shall design construction to insure maximum stability. The Lessee shall make soil foundation investigations in conjunction with construction activities. The Lessee shall make such data available to the Mining Supervisor upon request.

(F) Materials

The Lessee shall, when feasible, utilize waste rock from the mining operations for road beds, fills and other similar construction purposes. When not feasible, gravel and other construction materials shall be purchased in accordance with 43 CFR 3610, as now in effect or as hereafter amended, or, if it shall be superseded, the regulation or rule superseding it, except that the sale of such materials from stream beds and upland soil areas shall be avoided unless otherwise approved by the Bureau District Manager.

(G) Slopes of Cut and Fill Areas

To the extent consistent with good mining practice, the Lessee shall maintain all cut and fill slopes in a stable condition for the duration of the Lease.

(H) Impoundments

The Lessee shall establish safe access to permanent water impoundments for persons, lifestock, and wildlife, but, where consumption of such water would be harmful to humans or the use of such water would be detrimental to animals, he shall take necessary steps to prevent access by those to whom it would be harmful or detrimental.

(I) Flood Plains

The Lessee shall not construct improvements or conduct operations in flood plains or stream drainages when it is reasonable to expect risk to human life, pollution damage, or destruction of the existing environment caused by flood damage, without the express permission of the Mining Supervisor and without providing for protection of any such improvements constructed.

(J) Land Reclamation

The Lessee shall, unless otherwise directed by the Mining Supervisor, backfill, level, final grade, cover with topsoil and initiate revegetation of each segment of the operation area in accordance with the rehabilitation plan as soon

as that segment is no longer needed, but not later than one year after completion of the particular operation unless an alternative schedule has been approved by the Mining Supervisor.

(K) Overburden

The Lessee shall, unless otherwise directed by the Mining Supervisor, separate overburden material and stockpile it separately as to topsoil, and rock material for later use as fill and as top dressing for rehabilitation of disturbed areas.

(L) Revegetation

(1) The Lessee shall revegetate all portions of the Leased Lands which have been disturbed by his operations as soon as possible after the disturbance has ended in order to prevent, or, if prevention is impracticable, to minimize erosion and related problems. The Lessee shall restore the vegetation of disturbed areas by reestablishing permanent vegetation of a quality which will support fauna of the same kinds and in the same numbers as those existing at the time the base line data was obtained under section 1(C) of these Stipulations. Plans for revegetation, including species, density, and timing, must be submitted to the Mining Supervisor for approval. The Mining Supervisor may require any reasonable methods of revegetation, and, if he deems it desirable, may

require the Lessee to fence areas to assist revegetation. However, if the Lessor determines, at the time of submission of the detailed development plan under section 10(a) of this lease, that the Leased Lands will, upon the termination of the lease, be put to a different use from that to which they were devoted immediately prior to the issuance of this lease, the Mining Supervisor may require the Lessee to revegetate the land to meet that objective, except that the Lessee shall not be required to expend more money than that needed to meet the first revegetation standard.

(2) The Lessee shall initiate a revegetation program approved by the Mining Supervisor at the start of production to (1) delineate those parameters necessary to establish vegetation at a specific location and (2) show that successional changes in vegetation are compatible with the requirements under subparagraph (1) above.

(3) The Lessee shall demonstrate at the time of submission of the detailed development plan under section 10(a) of this lease that revegetation technology is available to enable him to provide the revegetation of the disturbed areas which is required under paragraph (1) of this subsection. If, in the opinion of the Mining Supervisor, the Lessee has failed to deomonstrate the required technology, he shall be required to submit for approval a program designed to obtain the required technology. If the program to obtain the necessary technology is satisfactory, the Mining Supervisor may approve the Lessee's development plan submitted under section 10(a), but, if the

Lessee has not demonstrated the necessary technology by the tenth Anniversary Date after the Lease Year in which the development plan under section 10(a) was approved, the Lessee shall cease all exploratory, development, and production operations under that plan until he has demonstrated that the necessary technology is available to him. The Lessee shall report annually to the Mining Supervisor on the progress of this approved program to obtain the required technology. If the progress appears inadequate at any time, the Mining Supervisor may request the Lessee to amend the program. Whenever the Lessee has demonstrated the necessary technology, the required program shall terminate. Where the Mining Supervisor finds the Lessee has conducted his program to obtain technology, including any requested amendments, in a diligent manner and has expended funds in excess of $500,000 on that program, the Secretary may determine the expenditures in excess of that figure to be extraordinary costs within the terms of section 7(d) of the lease and may credit those excess expenditures against any present or future royalties due the lessor, provided the results of the program are made public.

SECTION 12. SCENIC VALUES

(A) Scenic Considerations in General

The Lessee shall, except where the Mining Supervisor has approved otherwise, use the following standards in all designing, clearing, earthmoving, and construction:

(1) Contours compatible with the natural environment shall be used to avoid straight lines.

(2) Natural colors consistent with the local environment such as pastels or muted shades of brown, green, reds, or greys shall be used in painting of facilities installed on the lease. Bright or unnatural colors shall be avoided except for use in waring signs or signals.

(3) Small natural openings or the edges of larger opening in the natural environment shall be utilized in construction of facilities, or disturbing the land surface.

(4) During the time when the land is disturbed, the portion of land which is not under revegetation programs shall only be those areas required under the mining plan for mining, storage, processing, or disposal operations.

(5) Contouring of the disturbed areas for reclamation shall simulate natural opening or areas consistent with the surrounding topography.

(B) Consideration of Aesthetic Values

The Lessee shall consider existing aesthetic values in all planning, construction, reclamation and mining operations. All operations, including, but not limited to, design and construction of roads, pipelines and transmission lines, shall, where practicable, be performed so as to minimize visual impact, make use of the natural topography, and to achieve harmony with the landscape.

(C) Protection of Landscape

The Lessee shall design any structures and facilities built under this Lease so that they will, to the extent practicable, blend with the natural landscape.

(D) Signs

The Lessee shall design and construct signs that are rustic in appearance and conform to BLM sign standards.

SECTION 13. VEGETATION

(A) In General

(1) The Lessee shall reserve from cutting and removal all timber and other vegetative material outside the clearing boundaries and all blazed, painted or posted trees which are on or mark the clearing boundaries, with the exception of danger trees or snags designated as such by the Mining Supervisor.

(2) The Lessee shall insure that all trees, snags or other woody material cut in connection with clearing operations are felled into the right-of-way and away from live water courses.

(B) Timber

The Lessee shall deal with timber in accordance with the following: clearing and grubbing limits shall be approximately 5 ft. outside of the edge of any cut or fill; where practicable, trees, snags, stumps or other woody material not having wildlife value or value to the Lessee shall be mechanically chipped and spread in a manner that will aid seeding establishment and soil stabilization; clearing boundaries shall be identified on the ground prior to clearing operations.

(C) Clearing and Stripping

The Lessee may clear and strip only such land as is necessary for mining, processing, disposal, and other operations under the lease. In connection with such operations the Lessee may clear and strip land necessary for roadbeds, but such roadbed widths shall be not more than 25 feet from the centerline unless otherwise specified by the Mining Surpervisor.

SECTION 14. WASTE DISPOSAL

(A) Mine Waste

The Lessee shall, in accordance with the detailed development plan under section 10(a) of thia lease, backfill or reclaim excavated material and spent shale and shall compact it thoroughly by machinery to avoid or, where avoidance is impossible, minimize erosion. The Lessee shall design slope faces of waste piles to insure slope stability and shall revegetate slope faces in accordance with the rehabilitation plan.

(B) Other Disposal Areas

The term "waste" as used in this subsection (B) means all waste other than mine waste. In accordance with approved plans, the Lessee shall collect, recycle or dispose of waste in sanitary land fills or other disposal areas, and shall use the best practicable portable or permanent waste disposal systems, as approved by the Mining Supervisor. The Lessee shall remove or otherwise dispose of all waste in a manner acceptable to the Mining Supervisor, and in accordance with all applicable standards and guidelines of the State, the United States Public Health Service and the Environmental Protection Agency.

(C) Disposal of Solid and Liquid Wastes

The Lessee shall design and construct disposal systems for solid and liquid wastes so as to avoid landslides, control erosion by wind and water, and establish conditions conducive to vegetative growth in the disposal area. The Lessee shall select and prepare disposal sites for wastes so as to avoid downward percolation of leached products and other pollutants into aquifers.

(D) Impoundment of Water

No disposal of mine waste, other waste, or the residue from any activity under this Lease shall be disposed of in a manner which could cause an impoundment of water unless plans for spillways and means of diversion and the prevention of both surface and underground water contamination have been prepared by the Lessee and approved by the Mining Supervisor, and the Lessee has complied with those plans.

(E) Slurry Waste Disposal

Wherever slurry waste disposal is used the Lessee shall provide impoundments sufficient to contain landslides, mud flows, or waste pile blowouts.

AMENDMENT OF OIL SHALE LEASE Number 1

LEASE NUMBER C-20046, Tract C-a

Pursuant to Section 1 (B) of the Oil Shale Lease Environmental Stipulation which sets forth procedures for changing environmental stipulations, the parties to this document have agreed to revise the stipulation contained in the second paragraph of Section 1(C)(2)(c), Air Quality, to read as follows:

> The Lessee shall monitor air quality for sulphur dioxide, hydrogen sulphide, and suspended particulates, using automatic instruments with continuous recorders, when applicable.. The Lessee shall also monitor, under the same conditions, hydrocarbons, oxides of nitrogen, and other pollutants, where the Area Oil Shale Supervisor has determined that such monitoring is necessary to determine baseline air quality or to conduct an effective monitoring program. In addition, the Lessee shall establish a meteorological station in reasonable proximity to each proposed plant site to monitor, at least 95 percent of the time over each lease year during which monitoring is required, wind direction and speed (vane and anemometer) at three levels, one at least 100 feet above the surface of the plant site, one at approximately 30 feet above the surface of the plant site, and one at an intermediate level, and temperature at two levels, one at least 100 feet above the surface of the plant site, and one at approximately 30 feet above the surface of the plant site, and humidity at one level. The Lessee shall maintain records of all baseline data collection and monitoring programs.

Peter A. Rutledge
Peter A. Rutledge
Area Oil Shale Supervisor
U. S. Geological Survey

W. T. Herget
W. T. Herget
Attorney-in-fact
Standard Oil Company (Indiana)

Marvin W. Pearson
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William E. Moffett
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Attorney-in-fact
Gulf Oil Company

October 31, 1974
Effective Date

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Purpose of Changes

The agreed revisions are for the purpose of eliminating the requirement for ground level wind direction and speed measurements substituting instead a requirement for an intermediate level wind direction and speed measurement, and eliminating the requirement for three humidity measurements at different levels substituting instead a requirement for a single humidity measurement at one level.

Justification for Changes

The agreed changes apply to measurements related to air quality-meteorologic segments of base line data and environmental monitoring.

The definition of ground level by agencies responsible for meteorological monitoring is commonly placed between 5 and 30 feet. Measurements at ground level do not provide additional data beyond that gained at the required 30-foot level. Climatic conditions, particularly snow accumulations, will cover ground level sensors causing unreliable readings and resulting in excessive instrument downtime beyond the required 95 percent monitoring efficiency levels. In addition, humidity, the ratio of water vapor in atmosphere to the amount required for saturation at the same temperatures, will not change within instrument accuracy limits between the three tower levels originally specified in the stipulationa.

The agreed changes have been discussed with and concurred in by the Environmental Protection Agency and State Departments of Health.

OSMIS
TRACT C-A
SEQ. NO. 0003
VOLUME 1 OF 1

OSMIS
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NO.

AMENDMENT OF OIL SHALE LEASE

Number 2

SERIAL NUMBER C-20046

Tract C-a

Pursuant to Section 1(B) of the Oil Shale Lease Environmental Stipulations which set forth procedures for revising and amending the Environmental Stipulations, the parties to this document hereby agree, effective June 1, 1975, that the stipulations contained in Section 1(C)(2)(d), Flora and Fauna, be amended to read as follows:

> Flora and Fauna. The Lessee shall make studies of the flora and fauna of the leased lands and of all other lands lying within a mile of the leased lands, and of all lands to be used for disposal of residues from mining and processing oil shale, and also of the aquatic habitat as far downstream as the Mining Supervisor shall require. These studies will determine the distribution and density of the flora in these areas and periodically determine the condition of such flora. These studies shall also periodically determine the species of fauna, their distribution, and their relative abundance. The selection of sampling periods for these studies will be based on the latest available scientific information, and will be approved by the Mining Supervisor. The Lessee shall submit a report to the Mining Supervisor of the baseline data obtained and, during the monitoring program, shall submit semi-annual reports to the Mining Supervisor showing whether or not there has been any change. The Lessee shall also study and report to the Mining Supervisor on ecological interrelationships, including migratory patterns of birds, mammals, and fish, and plant-animal relationships. The Lessee shall compile an inventory of natural surface water features, such as springs and seepa.

THE UNITED STATES OF AMERICA

By Peter A. Rutledge
Peter A. Rutledge
Area Oil Shale Supervisor
U.S. Geological Survey

By Marvin W. Pearson
Marvin W. Pearson
District Manager
Bureau of Land Management

STANDARD OIL COMPANY (INDIANA)

By
W. T. Herget
Attorney-in-fact

GULF OIL COMPANY

By William E. Moffett
W. E. Moffett
Attorney-in-fact

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NO. 82 0021926

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AMENDMENT OF OIL SHALE LEASE

Number 3

SERIAL NUMBER C-20046

Tract C-a

Pursuant to Section 1(B) of the Oil Shale Lease Environmental Stipulation which sets forth procedures for changing environmental stipulations, the parties to this document have agreed to revise the stipulation contained in Section 1(C)(2)(c), Air Quality, to read as follows:

(c) Air Quality and Meteorology.

(1) The objectives of the Air Quality and Meteorology monitoring program are to define the existing environment as a baseline against which to compare future changes, define meteorological factors which might influence the transport and diffusion of pollutants which might be emitted by sources on or near the tracts, identify the meteorology of the area for detailed planning purposes, monitor impacts of lease development and operation on air quality, determine source and magnitude of plant emissions, and provide information for plant operation to minimize impacts of future facility operations.

(2) In the collection of baseline data to meet the above stated objectives, the Lessee shall record air quality, using strategically-located stations. The number and location of stations shall be recommended by the Lessee and approved by the Mining Supervisor. One of the stations shall be located as close to the expected point of maximum concentration as feasible. Once established pursuant to this stipulation the number and location of such stations shall not be changed except by mutual consent of the Mining Supervisor and Lessee.

(3) The Lessee shall collect air quality data for all pollutants that the Mining Supervisor determines are necessary to establish baseline air quality, including but not limited to sulphur dioxide, hydrogen sulphide, suspended particulates, hydrocarbons, oxides of nitrogen, ozone, and carbon monoxide.

(4) In addition to the stations required by paragraph 2(c)(2) of this Subsection (c), the Lessee shall establish a meteorological station in reasonable proximity to each proposed plant site to record wind direction and speed (vane and anemometer) at two levels, one at least 30 meters above the surface of the plant site, one at approximately 10 meters above the surface of the plant site, and temperature at two levels, one at least 30 meters above the surface of the plant site, and one at approximately 10 meters above the surface

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of the plant site, and humidity at one level. An upper air data collection program shall be implemented as deemed necessary by the Mining Supervisor for the purpose of obtaining information for diffusion modeling.

(5) The Lessee shall establish a monitoring program. To assist in the identification of pollutants to be monitored, the Lessee shall submit to the Mining Supervisor a detailed description of emissions anticipated during the development of the Leased Lands and Leased Deposits. The Lessee shall also monitor source emissions at locations approved by the Mining Supervisor.

(6) In the design and operation of the baseline data collection and monitoring programs, the Lessee shall strive to collect data for the greatest period of time practicable with emphasis on acquisition of quality data. The Lessee shall establish and implement a quality assurance program approved by the Mining Supervisor to assure high quality data collection. This quality assurance program shall include but not be limited to: quality control by standard reference materials, such as those available through National Bureau of Standards; data validation through established criteria of acceptability; method and frequency of calibration and maintenance; and testing programs to identify and quantify data anomalies.

(7) The Lessee shall maintain records and submit reports of all baseline data collection and monitoring programs. Where practicable, data shall be programmed in a format compatible with a nationally recognized computer data storage and retrieval system.

THE UNITED STATES OF AMERICA
By____________________
Peter A. Rutledge
Area Oil Shale Supervisor
U.S. Geological Survey

By____________________
Marvin W. Pearson
District Manager, Bureau of Land Management

STANDARD OIL COMPANY (INDIANA)
By____________________
W.T. Herget
Attorney-in-fact

GULF OIL CORPORATION
By____________________

APPROVED AS TO FORM
KRD
6-4-76
LAW DEPT.

Effective Date: June 1, 1976

AMENDMENT OF OIL SHALE LEASE Number 4

SERIAL NUMBER C-20046

Tract C-a

Pursuant to Section 1(B) of the Oil Shale Lease Environmental Stipulations which set forth procedures for revising and amending the Environmental Stipulations, the parties to this document hereby agree, effective June 29, 1978, that the stipulations contained in Section 7D, Storage and Handling, be amended to read as follows:

Storage and Handling.

The Lessee shall store oil, petroleum products, industrial chemicals and similar toxic or volatile materials in durable containers and locate such materials so that any accidental spillage will not drain into water courses, lakes, reservoirs, or ground water. Unless otherwise approved by the Mining Supervisor, the Lessee shall store substantial quantities (more than 500 gallons) of such materials in an area surrounded by impermeable containment structures. The volume of the containment structures shall be at least: (1) one-hundred ten (110) percent of the largest tank plus displacement of all other tanks in the compound below the dike height or liquid level; plus (2) a volume sufficient for maximum trapped precipitation and run-off which might be impounded at the time of a spill. The earthen dike must have a flat surface three feet wide on top of the dike.

THE UNITED STATES OF AMERICA
By____________________
Peter A. Rutledge
Area Oil Shale Supervisor
U.S. Geological Survey

By____________________
Marvin W. Pearson
District Manager
Bureau of Land Management

GULF OIL CORPORATION

By____________________
J. B. Miller

Attorney-in-Fact

STANDARD OIL COMPANY (INDIANA)

By____________________

R. M. Lieber

Attorney-in-Fact

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FIFTH AMENDMENT TO OIL SHALE LEASE
SERIAL NUMBER C-20046

Tract C-a

Effective August 1, 1982, the oil shale lease number C-20046 is amended as follows:

Section 4 is changed to read:

> Section 4. This lease shall be for a period of 25 years from the Effective Date and so long thereafter as there is production from the Leased Deposits in commercial quantities, subject to the provisions of section 23 with respect to the readjustment of terms and conditions and the right of the parties to terminate the lease.

Section 7(e) is changed to add:

> (3) In the event a suspension of minimum royalty payments is granted pursuant to section 39 of the Act (30 U.S.C. § 209), and there is no concurrent suspension of operations and production, the Anniversary Date of this lease shall also be suspended for the same period of time the minimum royalty payments are suspended for, and only for, the purpose of determining the time for the payment of minimum royalty, the amount of such royalty, and the minimum royalty payments against which expenditures attributable to operations may be credited as set forth in Section 7(e)(1) and 7(e)(2).

Section 10(a)(3) is changed to read:

> (3) a requirement that the Lessee use all due diligence in the orderly development of the Leased Deposits, and, in particular, to attain, at as early a time as is consistent with compliance with all the provisions of this lease, production at a rate at least equal to the rate on which minimum royalty is computed under section 7(e)(1); Provided, however, that during any suspension of such minimum royalty payments, "due diligence" shall not be interpreted as relating to the rate of production on which minimum royalty is computed under section 7(e)(1) and shall not be related to any other actual or attempted rate of production.

THE UNITED STATES OF AMERICA

By
George C. Francis
Colorado State Director
Bureau of Land Management

Date 7/29/82

RIO BLANCO OIL SHALE COMPANY

By
Richard M. Lieber
President

Date July 23, 1982

By
J. F. Muirhead
Vice President

Date July 23, 1982

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APPENDIX B — COMMITTED MITIGATION

For committed mitigation, the lessee will comply with any applicable federal and state law. As used in Appendix B the lessee's obligation to comply with state law shall mean state laws that are not preempted by nor inconsistent with federal law or policy.

AIR QUALITY

Air quality impacts will be mitigated through application of BACT and through compliance with all state and federal emissions and ambient air quality regulations. Additional mitigation beyond BACT may be required on fugitive dust sources to meet the PSD Class II increments.

TOPOGRAPHY

Topographic impacts can be minimized with the proper design and engineering of roads, conveyors, and facilities which will reduce cut and fill requirements. Visual intrusions of the disposal pile cannot be mitigated beyond the reclamation requirements.

GEOLOGY AND SOLID MINERALS

Potential impacts could occur from areas of geologic instability such as landslides, faulting and areas with underground water flow. These impacts can be mitigated, to a certain degree, by following engineering procedures to correct potential problems or, where practical, by avoiding unstable areas. Examples of engineering practices include the installation of barriers or diversions where landslides could occur, and the installation of internal structures to prevent or carry off water movement in the affected areas.

Oil shale development is regulated by the Mineral Lands Leasing Act of 1920 as amended, and in all alternatives development will be guided by stipulations similar to those included in the prototype oil shale leases. Some modifications may be necessary at the time of leasing, and stipulations will be specified in a Detailed Development Plan submitted by the lessee. In addition, reclamation activities of the oil shale leases have regulatory requirements set by the Colorado Mined Land Reclamation Board.

FLUID MINERALS

The lessee of the disposal site shall agree to indemnify lessees of oil and gas with valid and existing rights as of the date of the offtract lease for the greater expense of directionally drilling to and producing fluids from beneath the disposal sites. In the event that it is not possible to produce fluid minerals beneath the disposal sites, the lessee of the offtract lease shall indemnify affected oil and gas lessees for the loss of valid, existing rights to fluid minerals.

HYDROLOGY

SURFACE WATER QUANTITY

Where there are detrimental impacts to the water supply to existing valid surface water rights, the Tract C-a lease holder will be required to augment these supplies in accordance with applicable state law.

SURFACE WATER QUALITY

In addition to adhering to the mitigation required in federal regulations, the state of Colorado has water quality standards that include basic standards for both surface and groundwater in the Colorado West Area 208 Plan and in their "Nondegradation Policy." The policy requires that state waters, both surface and groundwater, shall be protected such that existing uses and reasonably expected future uses are not impaired in accordance with Colorado law.

During the project life, waste handling, waste water discharges, and reclamation activities will be conducted under the lease and under applicable state and federal permit programs to mitigate hydrologic impacts. Mitigation will include sound engineering design of pipelines, dams, drainage crossings, and transportation routes to minimize erosion. Adequate precautions will be taken in the transport and handling of materials. Detention dams designed to contain leachate discharges from the pile will be lined. Detailed geochemical analysis of raw and spent shale will be done for determination of leachate characteristics.

Specific measures to mitigate the effects of spills will include a spill prevention, control, and countermeasures plan; installation of automated pipeline monitoring equipment; and inventory management for all product, by-product, and fuel storage tanks.

GROUNDWATER QUANTITY

In the areas of groundwater use, the Tract C-a lease holder will be required to augment and mitigate valid water rights in accordance with state law. The augmentation plan will mitigate adverse impacts of dewatering on existing water uses.

GROUNDWATER QUALITY

Leachate discharges from the processed shale disposal pile will be mitigated by the design of the pile. Runoff control features will function not only to minimize erosion, but also to direct flows off or around the disposal pile. Water thus directed off or around the pile will not be available for infiltration and leachate production. Reclamation efforts will enhance evapotranspiration from the pile, and thus further limit infiltration into the pile. Design features to limit infiltration appear to be more efficacious in mitigating leachate effects than are features to control leachate after it forms.

Although its effect on average infiltration and deep seepage will not be great, compaction of the processed shale on the outer segments of the pile may increase temporary water storage near the surface of the pile. Such water may be utilized by vegetation and thus decrease deep seepage into the pile.

Although 84 Mesa has been included in previous baseline studies of Tract C-a, hydrologic data for the alternative disposal sites are limited. If either the Philadelphia Creek or the West Fork of Spring Creek sites are selected, a comprehensive groundwater and surface water characterization study will be implemented. Studies at the leased site will be designed specifically to provide a basis for monitoring the effect of development at these alternative sites.

In the mitigation of erosion and runoff during project life, additional catchment basins shall be constructed in surface channels downstream from the disposal pile. This will be needed if near-pile control structures prove ineffective.

The potential presence of springs and seeps within the Philadelphia Creek or the West Fork of Spring Creek areas may necessitate the consideration of site specific drainage collection and diversion system within or beneath the disposal pile to prevent buildup of a groundwater table within the pile or within valley walls adjacent to the pile.

WILDLIFE

1. The lessee shall be required to offset or compensate mule deer, raptor, elk, and upland game bird habitat loss, where applicable, and the resultant loss or displacement of these evaluation species due to activities directly associated with development of an offtract disposal lease.

Concurrently with filing of the mine plan at the DDP stage, the lessee shall submit for approval to the BLM a Wildlife Mitigation Plan (WMP) for protection and/or enhancement of mule deer, raptor, elk, and upland bird populations affected by habitat loss or modification or displacement from historical habitat.

The WMP shall be developed by the offtract lessee in consultation with the BLM, CDOW, and USFWS. The WMP shall also indicate the strategies and methods to be employed by the lessee which will ensure that direct and indirect habitat losses directly attributable to offtract lease development are offset to the extent practicable during project implementation, and ultimately, that habitat values are restored to the point of compensating project-induced habitat losses.

The WMP, at a minimum, shall include:

a. A habitat analysis of the area potentially influenced by offtract lease development activities which:

— Identifies applicable evaluation species and their use of habitats within the area.

— Includes an analysis of the quality or carrying capacity of the habitat for those species.

b. A detailed description of the methods selected by the lessee to compensate or mitigate habitat loss, together with a comparative analysis of alternate methods that were considered and rejected by the lessee and the rationale for the decision to select the proposed methods.

The methods selected by the lessee may include, but are not limited to, the following techniques:

— Increasing the quantity and quality of forage available to wildlife.

— Acquiring of critical wildlife habitats.

— Installing structural improvements or mechanically manipulating low quality wildlife habitat to increase its carrying capacity for selected wildlife species.

— Recovering, replacing or protecting important wildlife habitat by selective fencing.

— Restoring important wildlife habitat values through wildlife oriented reclamation practices, including reconstructed land form configuration.

c. A time table giving the periods of time that will be required to implement and accomplish the WMP and showing how this time table relates to the overall development plan.

d. A detailed outline of monitoring programs that will be employed by the lessee to:

— Determine response of evaluation species to habitat protection, enhancement, and restortation activities as a means of objectively analyzing the efficiency of these practices.

— Evaluate changes in the distribution, abundance, and habitat use of targeted species to better define short-term impacts.

The WMP concept is intended to be a flexible and dynamic means of orchestrating wildlife-related mitigation and compensation. Over the life of the project, the lessee and cooperating agencies shall annually review and if considered necessary modify the WMP's objectives and implementation.

2. Additional consultation with the USFWS, as mandated by Section 7 of the Endangered Species Act, will be required before approval of the DDP when necessary water use information is available to accurately assess potential

impacts to the Colorado River squawfish, humpback chub, or other applicable listed or proposed threatened and endangered species.

3. The lessee shall be required to mitigate the loss or modification of any wetland, riparian, and aquatic habitats directly affected or influenced by lease development activities so as to compensate for loss of habitat values. The lessee shall identify, monitor and mitigate affected wetland, riparian, and aquatic habitats as an integral part of, or as a supplement to, the WMP.

4. Before final approval of the WMP, the lessee shall be responsible for conducting systematic surveys for raptor nest sites and nesting activity in areas that would be disturbed or adversely influenced by lease related activities. Survey methodology shall be developed in consultation with the USFWS. Targeted species will include all tree, cavity, ground, and cliff nesting species.

5. BLM cannot authorize actions that destroy, adversely modify, or disrupt any raptor nest site; therefore, no impacts to raptors or raptor nest sites will be permitted, except as specifically authorized by the USFWS. The lessee shall consult with the USFWS and CDOW, and through the WMP, institute measures to avoid, mitigate, or offset adverse impacts to raptors and their habitats.

LIVESTOCK GRAZING

The only mitigation that is required is reasonable compensation to the grazing permittees for the adjusted value of their interest in permanent range improvements that would be eliminated by this action (43 CFR 4120.3-6). No other mitigation is available to BLM.

WILD HORSES

Through decisions made in land-use plans for the Piceance Basin, BLM can require adequate mitigation for impacts to wild horses in this area. Mitigation will have to be adequate to provide for the minimum requirements of wild horses.

The principal impacts to wild horses from this action would be restricted migration, loss of suitable winter range and loss of watering areas on both the 84 Mesa site and the Philadelphia Creek site. The West Fork of Spring Creek site would have minimal impacts to wild horses. These impacts will be mitigated by the following measures:

1. RBOSC will be required to provide a corridor for the unrestricted movement of the wild horses between their summer and winter seasonal ranges. This area (corridor) could extend to the west and north, outside of the lease area and outside the present boundaries of the current Wild Horse Herd Management Area (HMA) as described in the Piceance Basin Resource Management Plan (RMP). The expansion of the Wild Horse Herd Management Area would require the preparation of an amendment to the RMP. RBOSC shall bear the cost to BLM (through a Memorandum of Understanding) associated with amending the RMP for this purpose.

2. Restricted movements on the Philadelphia Creek site can be mitigated by providing a barrier free corridor between the disposal pile and Douglas Creek.

3. Loss of important watering areas can be mitigated by providing an adequate and dependable water supply at or near existing watering areas and by developing new dependable watering supplies that will improve distribution and reduce concentration of wild horses on important wintering areas.

4. Other land use activities can be restricted by BLM on critical habitat for wild horses to reduce the human disturbance.

5. Forage losses to wild horses will be mitigated by reallocating forage presently used by livestock to wild horses on undisturbed areas of the herd management area.

6. The quality and quantity of forage for wild horses can be improved in critical habitat areas. Vegetation manipulations such as brush control and reseedings, using improved (introduced) forage grasses, will increase forage availability for wild horses, especially in wintering areas.

FORESTRY

Through existing BLM policy, any timber harvested as a result of energy related development will be appraised by the BLM at commercial prices and purchased by the project proponent before development or construction. This will be the same for all alternatives. No mitigation above and beyond this policy will be required.

LANDS AND REALTY

The offtract lessee shall bear the cost of relocating all facilities that are authorized by the United States and located within the offtract lease as of the date of the offtract lease. Relocation and rerouting of these facilities may require additional environmental analysis and this cost (through a Memorandum of Understanding) shall also be borne by the lessee. The lessee shall compensate injured parties for their losses if relocation of prior valid existing uses is unreasonable or impractical.

CULTURAL RESOURCES

The following measures will be required for the mitigation of primary direct impacts to the cultural resources, as mandated by the National Historic Preservation Act of 1976, as amended.

1. Conduct a Class III cultural resources inventory of all public lands within the boundaries of the tracts identified if

an acceptable inventory has not been performed. Provide the federal lead agency with a comprehensive cultural resources management document that addresses the cultural resources in the identified areas, including their significance and eligibility to the National Register of Historic Places (NRHP) and their relationship to the regional research design.

2. Rerecord and evaluate those cultural resources known to exist within the areas to be affected, but for which the current management data are insufficient. The scientific and National Register significance of these resources will be included in the document mentioned in mitigative measure 1.

3. Before the approval of a mine plan, including facilities areas, the BLM will seek concurrence on the determination of eligibility for cultural resources in any of the affected areas with the State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP), as established in the guidelines of 36 CFR 60. At that time, determinations of the effects of the proposed undertakings on cultural resources will also be identified and concurrence sought from the SHPO and ACHP, as established in the guidelines of 36 CFR 800.

4. At the time a mine plan is submitted to the BLM, a detailed mitigative plan for the cultural resources that cannot be avoided by direct impacts will also be submitted. The mitigative plan will directly relate to the research needs and issues identified in the resource management document of mitigative measure 1. The mitigative plan and research design will also use existing determinations of eligibility, management recommendations (McPherson 1983), where appropriate, as well as research concerns identified in the northwest Colorado regional research design (Grady 1984). The mitigative and research plan will be comprehensive in nature. Both the mitigative plan and research design will be subject to approval by the BLM before implementation of the mitigative program.

5. If the lessee conducts any surface-disturbing activities before the submission of a mine plan, a research design and mitigative plan for each significant or potentially significant cultural resource to be affected by the proposed action will be submitted to the BLM. The mitigative plan and research design will utilize the management recommendations and research concerns of the 1983 BLM document (McPherson 1983) and the northwest Colorado regional research design (Grady 1984); both will be comprehensive in nature. The mitigative plan and the research design will be subject to approval by BLM before implementation of the mitigative program.

Those impacts that have been identified as secondary direct impacts will also require specific mitigative measures for cultural resources before any surface-disturbing activities. The mitigative plan and research design will incorporate, as appropriate, the management recommendations and research concerns of the 1983 BLM document (McPherson 1983) and the northwest Colorado regional research design (Grady 1984) and will be comprehensive in nature. Both the mitigative plan and the research design will be subject to BLM approval before implementation of the program.

If the secondary direct impacts occur on federal lands that have not been previously inventoried at an acceptable level, the following stipulations will apply to the proposed action.

1. Conduct a Class III cultural resources inventory of all lands within the area of the undertaking and provide the federal lead agency with a comprehensive cultural resources management document that addresses the cultural resources of the area, including their significance and eligibility to the NRHP and their relationship to the regional research design.

2. Record and evaluate the cultural resources known to exist within the area of the undertaking but for which there is insufficient management data. The scientific and National Register significance of these resources will be included in the document mentioned in mitigative measure 1.

3. If direct impacts to significant cultural resource properties cannot be avoided, then data recovery programs or monitoring of surface-disturbing activities will be necessary. These programs will directly relate to the research needs and issues identified in the resource management document of mitigative measure 1. Although both data recovery and monitoring are considered as adequate mitigative measures, they must also be considered as having an effect on the cultural resource because the integrity of the site will be lost. However, because qualified, professional archaeologists are present during both data recovery and monitoring activities and knowledge is being gained about the cultural resource and/or its environment, the impact can be considered as beneficial.

The mitigation of cultural resources and the resultant analyses and management document for the offtract lease will compliment the research designs and evaluations and be supportive of the Tract C-a cultural resources document.

PALEONTOLOGY

Two of the three geologic formations (Uinta and Green River) within the area of the proposed undertaking have been categorized as Class Ib formations. The Holocene alluvium is a Class III formation and will not require any further consideration for paleontological resources. Certain measures will be implemented to comply with the extant legislation and guidelines (1906 Antiquities Act) with regard to the Class Ib formations and to mitigate the primary, direct impacts. These measures are:

1. Before the initiation of any surface-disturbing activities within the offtract lease area, the lessee will employ a qualified, professional vertebrate paleontologist who is familiar with the paleontology of the area and possesses the necessary permits to map the extent of the Class I and II geologic formations. The mapping will be accomplished utilizing USGS 7.5 minute (1:24,000 scale) quadrangles to

obtain accurate delineation of the formations and their outcrops. The mapping effort will be accomplished by using available geologic, vegetation, and soil data and aerial photographs to initially disclose the locations of the Class I and II formations. After the mapping phase is completed, the paleontologist will conduct a survey of all outcrops within the offtract lease area's that fall within the Class I or II designation to locate and evaluate all scientifically significant paleontological locations. Information on scientifically significant or sensitive sites within Class I areas will not be made public unless requested under the Freedom of Information Act.

The Geological Advisory Group (State of Colorado Natural Areas Program) shall provide consultation on the qualifications of potential vertebrate paleontologists and shall provide the guidelines and review capabilities for the quality control of both field work and report preparation.

2. If any paleontological specimens, as recommended by the Geological Advisory Group, are discovered during construction activities that may be disturbed by any further activities of the proposed undertaking, construction activities will be immediately suspended in the vicinity of the find. The object or feature will be left intact and the find reported to the federal lead agency. Construction may not proceed within the area of the find until authorized by the federal lead agency. Title to any paleontological specimens is expressly reserved by the federal lead agency and these specimens will not be removed from the site until they are evaluated by a qualified, professional paleontologist who possesses the necessary permits and is familiar with the paleontology of the area. The federal lead agency reserves the right to conduct periodic compliance checks or have these checks conducted by a qualified, permitted paleontologist during the stripping of overburden and the construction of appurtenant facilities to check for the existence of paleontological localities and to evaluate the localities for their significance to the paleontologic data base.

3. Paleontological sites identified during the paleontological inventory as "significant" or Class I will require special consideration during the construction effort. Mitigative measures may include, but not be limited to, avoidance of the site; monitoring of the locality during construction by a qualified, professional paleontologist; and/or paleontological data recovery (excavation).

4. If a fossil is discovered that has projectile points or other human artifacts in or near it; is charred, split, or cut; shows other marks or features indicative of human activity, all work on the fossil including construction work, excavation, and removal will be suspended until a qualified, professional archaeologist can evaluate the specimen(s) and determine its cultural affiliation and significance. Upon the determination that a human association does exist, the specimen(s) will be handled as a cultural resource under the procedures established for the protection of such resources (43 CFR 10) and mandated by ARPA of 1979, Section 3.

Those impacts that have been identified as secondary direct impacts will also require specific mitigative measures for paleontological resources before any construction activities. The four mitigative measures identified under the primary direct impacts will apply to these undertakings. However, because it is assumed that the paleontological inventory and resultant management document for the alternative disposal areas would be completed prior to, or concurrently with, these anticipated undertakings, the research designs and evaluations of significance shall be added to and supportive of the paleontological document.

RECREATION

The Cathedral Bluffs unit of the Piceance Basin SRMA has been recommended for designation in the Draft Piceance Basin RMP. Once the RMP is approved, a Recreation Area Management Plan will be developed by the BLM for the Cathedral Bluffs unit. The recreation plan will specify management actions by BLM to enhance recreational opportunities in the area. Mitigation for the offtract lease will specify that the Recreation Area Management Plan will develop and enhance recreational opportunities in other areas in the Piceance Basin equal to those displaced by the offtract lease development. Recreational opportunities specifically for hunting can be enhanced by improved access, facilities development, and wildlife habitat improvements. These shall be coordinated with mitigation for wild horses and wildlife effects, which could necessitate limits on human access.

Specific mitigation for the right-of-way corridor will include the construction of underpasses or other devices to allow wildlife to move through the overland conveyor system. This will, to some degree, help unify the portion of the special recreation management area that will be divided by the corridor.

VISUAL RESOURCES MANAGEMENT

1. All buildings and structures will be painted a dull hued (nonspectural) color which blends with the immediate vicinity around such objects.

2. Disposal areas will be cleared (only) before dumping.

3. Native vegetative types will be included in the process of permanently rehabilitating disturbed areas. A variety, including grasses, shrubs, and trees, will be used.

4. All structures not required for continuing operations of the oil shale processing facility will be removed.

5. Roads will be situated so as to be visually unobtrusive and will not be located on narrow ridgetops.

6. Newly established utilities associated with facilities will be subject to visual stipulations pertinent to siting, color, construction, and maintenance.

7. Rehabilitated areas will be subject to further stipulations specified after submittal of the plan of development

and operations. Such stipulations will include, among others, requirements to contour, seed, and maintain the area until it is successfully reclaimed.

NOISE

Noise impacts will be mitigated through application of work place noise controls, in conformance with the Occupational Safety and Health Act (OSHA) and Mine Safety and Health Administration (MSHA) regulations.

VEGETATION

Committed mitigation of disturbances to vegetation for all alternatives includes revegetation, as described in both the Vegetation section and under Surface Reclamation and Solid Waste Disposal. Reclamation, as required by the Colorado Mined Land Reclamation Act will require that disturbed areas be revegetated so as to be consistent with or equal to preexisting conditions and compatible with adjacent undisturbed areas.

THREATENED, ENDANGERED, CANDIDATE, AND SENSITIVE PLANT SPECIES

Mitigation of impacts that will probably occur on the Philadelphia Creek and West Fork of Spring Creek disposal alternatives will include avoidance of candidate or sensitive plants wherever possible.

Site-specific field surveys for threatened, endangered, candidate, and sensitive plant species will be required for the alternative disposal areas and right-of-way corridor as a part of the preparation of the DDP.

SOILS

Control of runoff and correction of loss of natural wind sheltering will be required during vegetation establishment. Methods will be employed to ensure that redistributed soil material is not overly compacted. Stripping of all the available soil and soil like material for redistribution during reclamation will be required.

SPOIL PILE DESIGN AND CONSTRUCTION

Construction of a stable disposal pile using environmentally sound techniques will be a part of the committed mitigation for all disposal alternatives. This will include during project life, adequate control of wind and water erosion; use of a compacted zone or other appropriate technology, at the surface of the processed shale portion of the disposal pile; monitoring of pile construction and other pile features related to stability, such as temperature, leachate production, and pile moisture. Remedial action and monitoring to assure pile stability will be required.

SURFACE RECLAMATION

Controlling erosion, maintaining or restoring soil fertility, and establishing a self-sustaining vegetative cover equal to or better than that present before disturbance will be part of the committed mitigation for reclaiming disturbances resulting from any of the offtract disposal alternatives. To assure the availability of appropriate surface growth medium, a detailed soil survey will be completed before stripping and analyzed after redistribution. Revegetation success will also be monitored to determine if appropriate vegetative cover has been established and to determine if any trace element adsorption toxic to livestock or wildlife has occurred.

APPENDIX C — ENVIRONMENTAL PROTECTION PERFORMANCE STANDARDS FOR THE PREFERRED ALTERNATIVE (84 MESA)

The following examples of performance standards have been developed in response to comments requesting specific environmental protection stipulations. Performance standards are goals to be pursued to achieve an acceptable level of resource protection during the operation of the lease. These standards, which have been prepared for the Preferred Alternative, are examples of performance standards that may be part of the offtract lease. From these standards, depending on the design proposed by the lessee, site and activity specific conditions of approval for the development plan (part of which is the disposal development plan) will be defined. The Bureau of Land Management (BLM), Craig District Manager (authorized officer) may make revisions to the conditions of approval to adjust to changed conditions, to correct an oversight, and to remain consistent with existing and new applicable federal, state, or local requirements for the protection of the environment. Should another alternative be selected, standards specific to that alternative will be developed.

1. **Air Quality.** At all times during construction and operation, the lessee shall conduct his or her activities in accordance with all applicable air quality standards and related plans of implementation adopted pursuant to the Clean Air Act, as amended (40 U.S.C. 50-99) including local and state standards, as now in effect or as hereafter amended. The lessee shall submit an air resource control program and monitoring plan for the authorized officer's approval.

The lessee shall make every reasonable effort to avoid generating fugitive dust problems. For example, sprinkling or other means of dust control shall be required. The lessee shall conduct processing operations so as not to create environmental or health problems associated with dust. The lessee shall obtain a state open burning permit prior to disposal of wastes by open burning.

2. **Wildlife.** The lessee shall be required to offset or compensate for mule deer, raptor, elk, and upland game bird habitat loss, because of activities directly associated with development of an offtract disposal lease.

Concurrently with filing of the disposal development plan, the lessee shall submit for approval to the BLM a wildlife mitigation plan (WMP) for protection and/or enhancement of mule deer, raptor, elk, and upland bird populations affected by habitat loss or modification or displacement from historical habitat.

The WMP shall be developed by the lessee in consultation with BLM, Colorado Division of Wildlife (CDOW), and U.S. Fish and Wildlife Service (USFWS). The WMP shall also indicate the strategies and methods to be employed by the lessee which will ensure that direct and indirect habitat losses directly attributable to lease development are offset to the extent practicable during project implementation and completion.

The lessee shall be responsible for conducting systematic surveys for raptor nest sites and nesting activity in areas that would be disturbed or adversely influenced by lease-related activities. Survey methodology shall be developed in consultation with BLM and USFWS.

BLM cannot authorize actions that destroy, adversely modify, or disrupt a raptor nest site; therefore, no impacts to raptors or raptor nest sites will be permitted, except as specifically authorized by USFWS. The lessee shall consult with BLM, USFWS, and CDOW, and through the WMP, institute measures to avoid, mitigate, or offset adverse impacts to raptors and their habitats.

The lessee shall be required to mitigate for the loss of or modification to any wetland, riparian, and aquatic habitats directly affected or influenced by lease development activities. The lessee shall identify, monitor, and mitigate affected wetland, riparian, and aquatic habitats as an integral part of, or as a supplement to, the WMP.

The lessee shall develop a disposal development plan (of operation) that will fully protect listed or proposed threatened or endangered species and shall submit the plan to BLM for formal consultation with USFWS, as required by Section 7 of the Endangered Species Act. The plan must cover threatened and endangered species occurring on site as well as those off-site threatened and endangered species that may be adversely impacted. Consultation must be completed before any irreversible or irretrievable commitment of resources is made.

This lease shall be issued subject to the agreement that consultation may require adjustments to the disposal development plan, addition of special conservation measures, or limitations to the project in order to assure compliance with the Endangered Species Act, as determined by USFWS.

3. **Wild Horses.** The lessee shall provide a corridor for the unrestricted movement of wild horses between their summer and winter seasonal ranges. This area (corridor) could extend to the west and north, outside of the lease area and outside of the present boundaries of the current Wild Horse Herd Management Area (HMA), as described in the pending Final Piceance Basin Resource Management Plan (RMP). The expansion of the Wild Horse Herd Management Area would require the preparation of an amendment to the RMP. The lessee shall reimburse any cost to BLM (through a Memorandum of Understanding) associated with amending the RMP for this purpose.

4. **Lands and Realty.** The lessee shall bear the cost of relocating all facilities existing as of the date of the offtract lease that are authorized by the United States and located within the offtract lease. Relocation and rerouting of these facilities may require additional environmental analysis, and this cost shall also be borne by the lessee. The lessee shall compensate injured parties for their losses if relocation of prior valid existing uses is unreasonable or impractical, as determined by the authorized officer.

5. **Hydrology.** At all times, during construction and operation, the lessee shall conduct his activities in accord-

ance with all applicable federal and state water quality and quantity laws, regulations, and standards. Where applicable federal and state water quality numeric standards do not exist, the authorized officer may establish reasonable standards to prevent degradation of water resources, for both surface and groundwater. The lessee shall not discharge or cause the discharge of waste water or water that will cause significant degradation or change the existing uses of any aquifer. Any surface discharge of water requires approval by both the state of Colorado and the authorized officer.

The lessee shall comply with all applicable laws considering handling and disposal of hazardous wastes. Further the lessee shall reinject no water, except in compliance with federal and state standards then in effect and where authorized to do so by the authorized officer.

The lessee shall submit a water management and monitoring plan for approval by the authorized officer as part of the disposal development plan. The plan shall include hydrologic monitoring during all phases of development, operations, and abandonment and shall address descriptions of water handling facilities, surface flow diversion and augmentation, dams, impoundments, seepage control, treatment facilities, and groundwater control in the vicinity of the surface waste disposal area. A contingency plan shall be included for the management of excess surface and groundwater flow. The plan shall include best available information on the source, storage, and disposal of all water, and related estimates of water quantity and quality.

6. **Spoil Pile Design and Construction.** The lessee shall submit an engineered plan for the construction of a stable disposal pile for approval by the authorized officer. The lessee shall also submit a disposal pile stability and settlement monitoring plan for approval by the authorized officer. The plan shall include methods to detect and quantify effects from stability and settlement. The lessee shall dispose of overburden and spent shale from mining and processing in a manner that will avoid or where avoidance is impracticable, minimize the discharge of toxic and/or saline water into surface drainages or groundwater.

7. **Surface Reclamation.** The lessee shall monitor topsoil to detect erosion that occurs. The lessee shall ensure the establishment of a self-sustaining vegetative cover equal to or better than that present before disturbance of the lease area, as determined by the authorized officer. The lessee shall conduct studies of the flora of the leased lands to determine baseline levels. The revegetation success shall be monitored to determine if appropriate vegetative cover has been established and to determine if trace element adsorption, toxic to livestock or wildlife, has occurred.

8. The lessee shall develop and submit for approval by the authorized officer an environmental resource monitoring plan that shall be in place before, during, and subsequent to disposal operations. The purposes of the environmental monitoring plan are: to determine baseline environmental conditions existing before any disposal operations on the lease; to provide a record during and subsequent to disposal of changes in the environment from conditions existing before disposal and from control sites where appropriate; to provide a continuing check on compliance with provisions of the lease, and all applicable federal, state and local environmental protection and pollution control requirements; to provide timely notice of detrimental effects and conditions; and to provide a factual basis for revision or amendment of these standards. The environmental monitoring plan shall be updated at the time of submission of the disposal development plan and may, at the discretion of, or with approval by the authorized officer, be modified as a result of information obtained after approval of the environmental monitoring plan, if necessary.

The monitoring plan shall address the potential effects of all lessee operations on the environment, including air, water, soils, biota, and other resources. The plan shall include a quality assurance program approved by the authorized officer that demonstrates sound experimental design consistent with the current state-of-the-art to assure high-quality data. The monitoring plan shall be conducted until the authorized officer has determined that environmental resource conditions have been established that are consistent with the requirements of applicable federal and state statutes and regulations. If monitoring results indicate violations of existing laws or standards, the authorized officer will take appropriate action. This environmental monitoring plan shall be an integral part of the disposal development plan required in the waste disposal lease. This monitoring plan shall be submitted within 18 months of the date the offtract lease is accepted and approved. The existing baseline data collected by lessee will be included as applicable in this monitoring plan for the waste disposal lease. Once the baseline for the offtract disposal lease has been established, the lessee shall not be required to continue the monitoring program on the waste disposal lease area until a date 6 months prior to the commencement of the development operations.

The lessee shall maintain records of all information obtained under the environmental monitoring plan and shall submit such records to the authorized officer in a format and at intervals prescribed by the authorized officer. The lessee shall promptly notify the authorized officer of unusual events or findings, including detrimental effects, conditions, and trends.

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